# Permit Application for Lower Howards Creek Sanitary Sewer Improvements Hampton/Vaught Permit Winchester, Clark County, Kentucky

Palmer Engineering Company, Inc.

**JACKSON ENVIRONMENTAL PROJECT NO. 10-005-101-07** 

Permit Application for Lower Howards Creek Sanitary Sewer Improvements Hampton/Vaught Permit Winchester, Clark County, Kentucky

#### Prepared For:

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#### 1.0 INTRODUCTION

Jackson Environmental Consulting Services, LLC, (Jackson Environmental) of Richmond, Kentucky was contracted by Palmer Engineering Company, Inc., of Winchester, Kentucky to identify the extent of all potential Section 404 issues, i.e., jurisdictional waters including wetlands and "other waters" of the U.S. for the Lower Howard Creek Sanitary Sewer Improvements in Winchester, Clark County, Kentucky (project area). The general project corridor consists of right-of-way, existing easements, proposed construction (temporary) easements, and proposed permanent easements. Proposed permanent easements extend 10 feet (ft) off both sides of the centerline of the proposed sewer alignment and are acquired for the entire length of the sewer. Construction easement is typically acquired 15 ft outside both sides of the permanent easement yielding a fifty foot easement for construction when construction and permanent easement are combined. In many locations throughout the project corridor where the proposed sewer parallels Lower Howard's Creek, construction easements are only acquired on the uphill side (away from the stream) of the sewer line to limit the area of disturbance in close proximity to the stream. In areas where no construction easement is acquired on the side of the sewer closest to Lower Howard's Creek, the construction easement is extended 35 ft outside of the uphill permanent easement. permanent and construction easements coincide with existing easements and right-of-way throughout the corridor. Existing right-of-way, existing easement, proposed permanent easement, and proposed construction easement make up the project corridor and establish limits of disturbance for construction. The project area is mapped on the United States Geological Survey (USGS) Austerlitz and Winchester quadrangles, 7.5-minute series, topographic map. The northern terminus of the project area is located at Universal Transverse Mercatur (UTM) coordinates E0746371, N4207980 North American Datum 1983 (NAD 83), Zone 17 the project area runs southwest to its southern terminus(UTM) coordinates E0746084, N4206844 then runs northeast to its eastern terminus at (UTM) coordinates E0746698, N4206853 (Attachment 1).

#### 1.1. Project Purpose

The project area was surveyed to identify the extent of all potential jurisdictional waters of the United States (jurisdictional waters), which include navigable waters, associated tributaries, and adjacent wetlands. Jurisdictional waters are subject to the provisions of Section 404 of the Clean Water Act (33 CFR 328) and Section 10 of the River and Harbors Act of 1899. Data provided in this document is based upon the opinion of Jackson Environmental. The United States Army Corps of Engineers (USACE) will have the final determination of the extent of jurisdictional waters.

#### 2.0 METHODS

#### 2.1 Wetland Delineation

Jackson Environmental conducted a level 3, routine wetland delineation as described in the U.S. Army Corps of Engineers Wetland Delineation Manual (Environmental Laboratory 1987) and the U.S. Army Corps of Engineers Jurisdictional Determination Form Instructional Guide Book, May 2007. Field investigations for the wetland delineation were completed on 28 and 29 July 2008.

Low-lying areas within the project area appearing to have the greatest potential for USACE regulation under Section 404 were selected and evaluated for the presence of hydrology, hydric soils, and hydrophytic vegetation. Sampling point location maps are provided in Attachment 2.

Jones, Plant Life of Kentucky (2005) and Strausbaugh and Core, Flora of West identifications. plant confirm certain (1978)was used to Virginia The U.S. Fish and Wildlife Service, National list of Vascular Plant Species that Occur in Wetlands: 1996 National Summary was used to determine wetland indicator status for the dominant species. Natural Resource Conservation Service's (NRCS) online soil survey data from Clark County (2002) was used to determine the Soil Conservation Service's (SCS) map units for the project area. The NRCS Hydric Soils List and Map Units With Hydric Inclusions in Clark County, Kentucky were also used to evaluate the potential for the occurrence of hydric soils within the project area.

Weather conditions (i.e., rain, humidity, and temperature), which potentially affect hydrologic indicators were recorded utilizing Weather Underground, Inc., (www.wunderground.com) during and three days prior to the date of the delineation.

Table 1. Weather conditions for dates of the delineation as well as three days prior

		Temper	ature	Hun	nidity
Date	Precipitation (in)	High (°F)	Low (°F)	High (%)	Low (%)
25 July 2008	0.00	86	67	92	42
26 July 2008	0.00	92	66	100	44
27 July 2008	0.00	93	67	100	29
28 July 2008	0.00	83	67	91	51
29 July 2008	0.00	90	70	91	41

Note: Days of the delineation are indicated in bold.

#### 2.2 Other Waters

#### 2.2.1 Stream Delineations

The project area was surveyed on 28 July 2008 and 29 July 2008 to identify the extent of potential "other waters" of the U.S. Jurisdictional extent was determined by the presence and/or absence of an Ordinary High Water Mark (OHWM) with a defined bed and bank, measured in linear feet and acres.

All streams within the project area were evaluated and were identified. Due to the narrow width of the project area, streams were not delineated in their entirety. Only the portions of streams within the project area were evaluated.

#### 2.2.2 Perennial/Intermittent/Ephemeral Conversion Zones

Ephemeral/Intermittent conversion zones were determined in accordance with the recommended protocol of the USACE "Guidance for Delineation of Ephemeral/Intermittent Streams for Purposes of the Memorandum Opinion and Order of October 20, 1999." The definitions for the stream type, provided by this protocol state:

Perennial conversion zones were based solely upon the USACE definition of perennial streams: "[The stream] has flowing water year-round during a typical year, has its primary source for stream flow from groundwater, the water table is located above the streambed for most of the year, and runoff from rainfall is a supplemental source of water for stream flow."

"An intermittent stream is a stream that has flowing water during certain times of the year when groundwater provides water for stream flow. Runoff after periods of precipitation gives only a supplemental source of water for stream flow. Intermittent streams may not have stream flow during dry periods."

"An ephemeral stream is a stream that has flowing water only during and for a short time after a precipitation event in a typical year, using runoff as a primary source of water for stream flow. Streambed for ephemeral streams are located above the water table and do not have groundwater as a source."

#### 2.2.3 Habitat Assessments

Poor

Habitat suitability of each stream was assessed and rated on 10 parameters in three categories using a modified version of the EPA Rapid Bioassessment Protocols for use in Streams and Wadeable Rivers. These parameters are listed and explained on the project field data sheets provided in Attachment 12. Each site was ranked according to its habitat score and classified by one of four levels of suitability.

Optimal	Classification range of 166-200; implies habitat has the structure
	and stability of substrate necessary to sustain a viable benthic
	macroinvertebrate population

Suboptimal Classification range of 113-165; implies habitat has 40% to 70% of the necessary structure and stability of substrate to sustain a viable

benthic macroinvertebrate population

Marginal Classification range of 61-112; implies habitat has 20% to 40% of the necessary structure and stability of substrate to sustain a viable benthic macroinvertebrate population

Classification range of 0-60; implies habitat has 0% to 20% of the necessary structure and stability of substrate to sustain a viable

benthic macroinvertebrate population

#### 3.0 FINDINGS AND RESULTS

#### 3.1 General Project Area Description

The project area is generally characterized as a mixture of residential and commercial properties and associated supporting infrastructure. Topography in the project area is characterized as generally flat to gently sloping. A perennial tributary, *i.e.*, Lower Howard Creek (LHC) bisects the project area (Attachments 1). Elevation in the project area ranges between approximately 919 ft and 984 ft above sea level.

#### 3.2 Current Land Use

The land use within and surrounding the project area is primarily urbanized, including residential and commercial properties, with small fragmented forests associated with the riparian zones along the eastern branch of Lower Howard's Creek. Additional land use includes water drainage, transmission lines (ROW), and roads. Representative photos are provided in Attachment 7.

Topography in the project area is characterized as generally flat to gently sloping. A perennial tributary, Lower Howard Creek bisects the project area (Attachment 1). Elevation in the project area ranges from approximately 919 ft to 984 ft above sea level.

#### 3.3 Wetlands

A total of five sampling points were established in three areas, and data was collected on the vegetation, hydrology, and soils at each of these locations. Five sampling points located in three areas (Wetland No. 1-2) totaling 0.649 ac were identified as potential Section 404 wetlands within the project area. These areas included Wetland No. 1 (0.476 ac), and 2 (0.173 ac), located in headwater tributaries of Lower Howard's Creek. Both wetlands met all criteria set forth by the *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987). Completed Corps data forms for all sampling locations are provided in Attachment 11. Representative photos of each wetland are provided in Attachments 8 and 9. The following table provides a summary of findings at each of the four sampling locations.

Table 2. Jurisdictional and non-jurisdictional wetlands within area of delineation.

Wetland ID	Potential Jurisdictional Wetland	Associated Stream	WAS Upland Points	WAS Wetland Points	Wetland Area (acre)
1	Yes	LHC	5	4	0.476
2	Yes	LHC	3	2	0.173
N/A	No	LHC		1	0.000

#### 3.3.1 Vegetation

The project area currently supports plant communities characteristic of small fragmented wetlands in an urbanized setting along Lower Howard's Creek. Species in this urbanized plant community include various grasses, such as fescue (Festuca rubra), iron weed (vernoia spp.), Johnson grass (Sorghum halepense) milk week (Asclepias virdidis), winter creeper (Euonymus fortunei), and wood nettle (Laportea canadensis).

Hydrophytic vegetation was observed at two of the three wetland sampling sites (Table 2) (Attachment 11). These areas are dominated by herbaceous species, including box elder (*Acer negundo*), black willow (*Salix nigra*), common rush (*Juncus effusus*), curly dock (*Rumex crispus*), green ash (*Fraxinus pennsylvanica*), and various sedges (*Carex spp.*).

#### 3.3.2 Wetland Hydrology

Wetland No. 1 receives water from upland runoff and precipitation as well as seasonal flooding of the east branch of Lower Howard's Creek (EBLHC). This wetland subsequently drains back into Lower Howard's Creek.

Wetland No. 2 receives water from upland agricultural runoff via a drainage corridor as well as from seasonal flood events of the EBLHC. This wetland subsequently drains back into (EBLHC).

Positive indicators of wetland hydrology were observed at two of the three sampling sites (Table 2).

#### 3.3.3 Soils Characterization

The NRCS soil survey for Clark County maps 13 soil series within the project area (Attachment 3). Three series (Linside, Melvin, and Newark), are listed as hydric by SCS and NRCS, when occurring within the floodplain. The soil series present in the project area include the Ashton series (AsB map unit), Ashwood series (AvD3 and AwD map units), Braxton series (BoB and BoC2 map units), Hampshire series (HmB, HmB2,

HmC, HmC2, HmD2, and HpC3 map units), Huntington series (Hs map unit), Lindside series (Ld map unit), Loradale series (LeB, LeC, and LeC2 map units), Maury series (MbB, MbC, and MbC2 map units), McAfee series (McB, McC, MfC2, MfD2, and MhE2 map units), Mercer series (MmB map unit), Melvin series (Ml map unit), Newark series (Ne map unit), and Salvisa series (SaD3, ScB2, ScC2, ScD2, and ScE2 map units). Positive indicators of hydric soils were observed at seven of the 14 sampling sites (Table 2) (Attachment 2).

The Ashton series consists of very deep, well drained soils that formed in loamy alluvium on low stream terraces and alluvial fans. Permeability is moderate. Slopes range from 0 to 15 percent.

The Ashwood series consists of moderately deep, well drained soils on uplands in residuum weathered from phosphatic limestone. Slopes range from 2 to 70 percent.

The Braxton series consists of very deep, well drained soils on undulating to hilly uplands and high terraces formed in old clayey alluvium or valley fill and residuum weathered from limestone. Permeability is moderately slow. Slopes range from 2 to 50 percent.

The Hampshire series consists of deep, well drained soils on uplands formed in clayey residuum of interbedded limestone and shale and the underlying residuum of interbedded siltstone, fine grained sandstone, shale, and limestone. Permeability is moderately slow. Slopes range from 2 to 30 percent.

The Huntington series consists of very deep, well-drained soil in alluviums on flood plains. Permeability is moderate. Slopes range from 0 to 15 percent.

The Lindside series consists of deep, moderately well drained soils formed in alluvium washed mainly from lime influenced soils on uplands and nearly level flood plains. Permeability is medium. Slopes range from 0 to 3 percent.

The Loradale series consists of deep, well drained soils formed in old alluvium residuum from limestone and thin layers of calcareous shale. Permeability is moderately slow. Slopes range from 0 to 12 percent.

The Maury series consists of deep, well-drained soils formed in silty material and weathered limestone, or old alluvium in upland areas. Permeability is moderate. Slopes range from 0 to 20 percent.

The McAfee series consists of moderately deep, well-drained soils formed in residuum weathered from limestone on upland ridge tops and side slopes. Permeability is moderately slow. Slopes range from 2 to 50 percent.

The Melvin series consists of very deep, poorly drained soils formed in silty alluvium on flood plains and in upland depressions. Permeability is moderate. Slopes range from 0 to 2 percent.

The Mercer series consists of deep, moderately, well drained soils formed partly in loess and partly in clayey residuum from phosphatic limestones. Permeability is slow. Slopes range from 0 to 12 percent.

The Newark series consists of very deep, somewhat poorly drained soils formed in mixed alluvium from limestone, shale, siltstone, sandstone, and loess on nearly level flood plains and in depressions. Permeability is moderate. Slopes range from 0 to 3 percent.

The Salvisa series consists of moderately deep, well drained soils formed in residuum from limestone or interbedded limestone and shale. Permeability is moderately slow. Slopes range from 2 to 30 percent.

#### 3.4 FEMA 100-Year Floodplain Issues

The project area is 6,828 ft in length of which, approximately 1,100 ft is not located within the mapped FEMA 100-year floodplain (Attachment 5).

#### 3.5 STREAM CROSSINGS

The USGS Winchester Quadrangle (7.5-minute series) topographic map indicates that Lower Howard's Creek flows through the project area and has four unnamed tributaries and one swale within the project area. Field investigation confirmed the presence and designation of Lower Howard's Creek and documented the presence of five unnamed tributaries of Lower Howard's Creek (UT-A, UT-B, UT-C, UT-D, and UT-E) and one swale (Swale 1) within the project area. (Attachment 2). The project area intersects Lower Howard's Creek at nine locations (SC-01, SC-02, SC-04, SC-05, SC-06, SC-07, SC-08, SC-11, and SC-12) and intersect UT-A at two locations (SC-09 and SC-10). Additionally, the project area intersects both Lower Howard's Creek and UT-E near its confluence (SC-03). Representative photographs are provided in Attachment 10 for stream crossings 1-12. The UTM coordinates for each of the twelve stream crossings are included in table 3.

#### 3.5.1 Stream Crossing 01 (SC-01)

Stream Crossing 01 (SC-01) is located in Lower Howard's Creek a perennial stream. The potential impacts of SC-01 are 7.72 ft (0.00114 ac). The stream quality is rated as Marginal with a score of 111.

#### **3.5.2** Stream Crossing **02** (SC-**02**)

Stream Crossing 02 (SC-02) is located in Lower Howard's Creek a perennial stream. The proposed impacts of SC-02 are 6.99 ft (0.00044 ac). The stream quality is rated as Marginal with a score of 108.

#### 3.5.3 Stream Crossing 03 (SC-03)

Stream Crossing 03 (SC-03) is located in at the confluence of Unnamed Tributary E (UT-E) and Lower Howard's Creek. The proposed impacts of SC-03 and Lower Howard's Creek combined are 6.00 ft (0.00077 ac). The stream quality was rated as Poor with a score of 52.

#### **3.5.4** Stream Crossing **04** (SC-**04**)

Stream Crossing 04 (SC-04) is located in Lower Howard's Creek a perennial stream. The proposed impacts of SC-04 are 6.18 ft (0.00087 ac). The stream quality was rated as Marginal with a score of 77.

#### 3.5.5 Stream Crossing 05 (SC-05)

Stream Crossing 05 (SC-05) is located in Lower Howard's Creek a perennial stream. The proposed impacts of SC-05 are 7.14 ft (0.00104 ac). The stream quality was rated as Marginal with a score of 94.

#### 3.5.6 Stream Crossing 06 (SC-06)

Stream Crossing 06 (SC-06) is located in Lower Howard's Creek a perennial stream. The proposed impacts of SC-06 are 7.91 ft (0.00124 ac). The stream quality was rated as Poor with a score of 59.

#### **3.5.7** Stream Crossing 07 (SC-07)

Stream Crossing 07 (SC-07) is located in Lower Howard's Creek a perennial stream. The proposed impacts of SC-07 are 6.22 ft (0.00086 ac). The stream quality was rated as Marginal with a score of 87.

#### 3.5.8 Stream Crossing 08 (SC-08)

Stream Crossing 08 (SC-08) is located in Lower Howard's Creek a perennial stream. The proposed impacts of SC-08 are 5.30 ft (0.00161 ac). The stream quality was rated as Marginal with a score of 103.

#### 3.5.9 Stream Crossing 09 (SC-09)

Stream Crossing 09 (SC-09) is located in Unnamed Tributary A (UT-A) a perennial tributary of Lower Howard's Creek. The proposed impacts of SC-09 are 9.85 ft (0.00111 ac). The stream quality was rated as Suboptimal with a score of 144.

#### 3.5.10 Stream Crossing 10 (SC-10)

Stream Crossing 10 (SC-10) is located in Unnamed Tributary A (UT-A) a perennial tributary of Lower Howard's Creek. The proposed impacts of SC-10 are 5.18 ft (0.00033 ac). The stream quality was rated as Suboptimal with a score of 144.

#### 3.5.11 Stream Crossing 11 (SC-11)

Stream Crossing 11 (SC-11) is located in Lower Howard's Creek a perennial stream. The proposed impacts of SC-11 are 25.72 ft (0.00443 ac). The stream quality was rated as Marginal with a score of 88.

#### 3.5.12 Stream Crossing 12 (SC-12)

Stream Crossing 12 (SC-12) is located in Lower Howard's Creek a perennial stream. The proposed impacts of SC-12 are 5.88 ft (0.00088 ac). The stream quality was rated as Marginal with a score of 88.

	Stream		J.engih	Length and Acres of Impacts	mpacts		
	Quality (EPA RBA)	Date	Ephemeral Ft (ac)	Intermittent Ft (ac)	Perennial Ft (ac)	Ft (ac)	Langitude Longitude
SC-01	111	8002/62/L	-		7.72 (0.00114)	7.72 (0.00114)	16 S 0746005 4206771
SC-02	108	7/29/2008	I	ł	6.99 (0.00044)	6.99 (0.00044)	16 S 0746177 4207381
SC-03	52	7/29/2008	l	ł	6.00 (0.00077)	6.00 (0.00077)	16 S 0746185 4207415
SC-04	77	7/29/2008	1	6.18 (0.00087)	1	6.18 (0.00087)	16 S 0746242 4207534
SC-05	94	7/29/2008		7.14 (0.00104)		7.14 (0.00104)	16 S 0746262 4207606
SC-06	59	7/29/2008	-	7.91 (0.00124)		7.91 (0.00124)	16 S 0746329 4207794
SC-07	87	7/29/2008	-	6.22 (0.00086)		6.22 (0.00086)	16 S 0746348 4207916
SC-08	103	7/29/2008	-	-	5.30 (0.00161)	5.30 (0.00161)	16 S 0746246 4206801
SC-09	144	7/29/2008	ŀ	9.85 (0.00111)	-	9.85 (0.00111)	16 S 0746568 4206936

			Length	Length and Acres of Impacts	mpacts		
Name	Quality (EPA RBA)	Date	Ephemeral Ft (ac)	Intermittent Ft (ac)	Perennial Ft (ac)	Total Ft (ac)	Latitude and Longitude
SC-10	144	7/29/2008	1	5.18 (0.00033)	I	5.18 (0.00033)	16 S 0746568 4206936
SC-11	88	7/29/2008	-	25.72 (0.00443)	1	25.72 (0.00443)	16 S 0746624 4206886
SC-12	88	7/29/2008	1	5.88 (0.00088)	l	5.88 (0.00088)	16 S 0746624 4206886
Ţ	TOTAL		ı	74.08 (0.01076)	26.01 (0.00396)	100.09 (0.01472)	

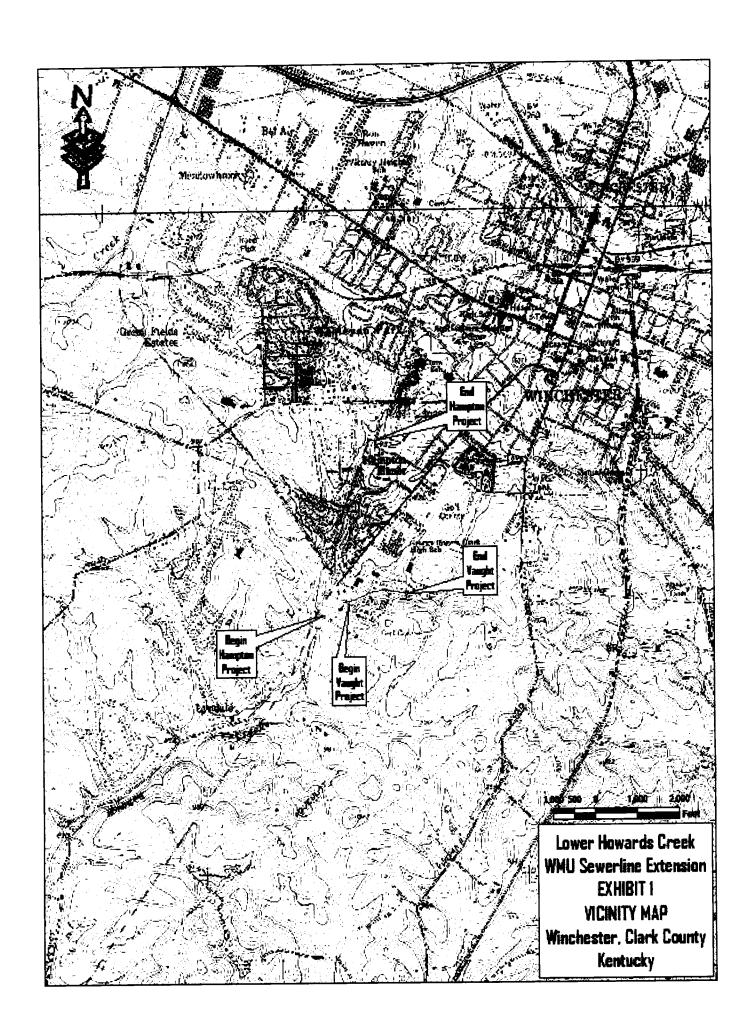
#### 4.0 CONCLUSIONS

Twelve stream crossings, totaling 100.09 ft (0.0147 ac), were identified as potential impacts to jurisdictional waters ("other waters") of the U.S. These "potential impacts" included 26.01 ft (0.00396 ac) of perennial stream channel impacts. The four perennial stream sections were rated as Marginal with an average habitat assessment score of 93.5. The remaining "potential impacts" include 74.08 ft (0.01076 ac) of intermittent stream channel impacts. The eight intermittent stream sections were also rated as Marginal with an average habitat assessment score of 98.

Two wetland areas, totaling 0.649 acres were identified as potential jurisdictional wetlands. Neither of the two wetlands will be impacted by the proposed sewer line project.

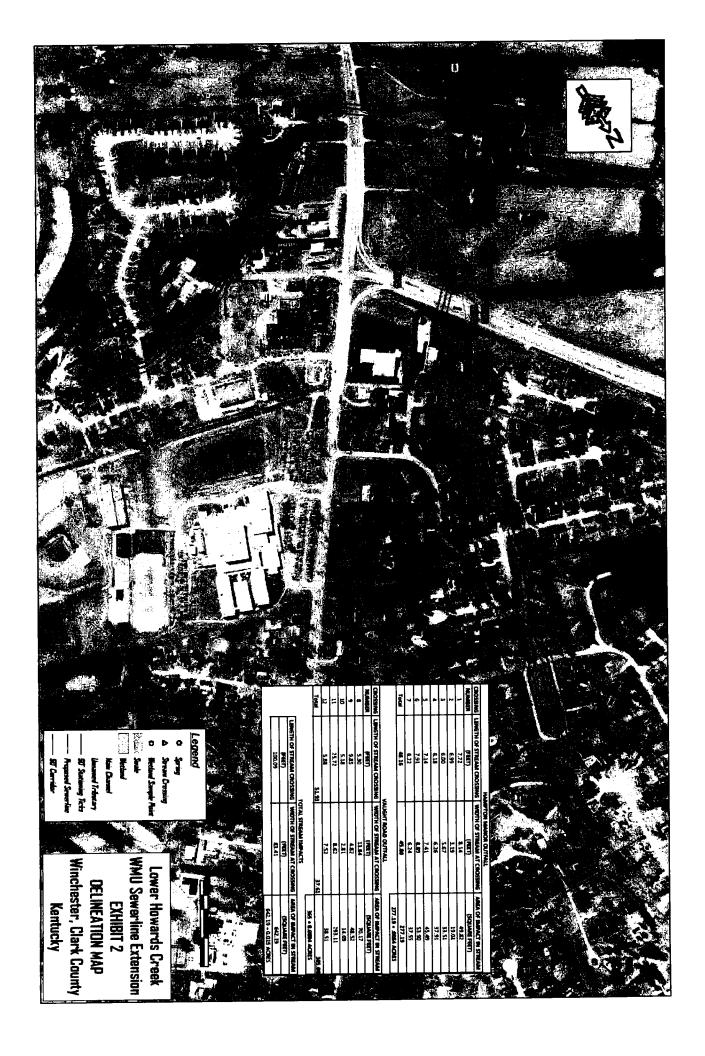
## Attachment 1

Vicinity Maps



Attachment 2	2
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Wetland and Stream Crossing Maps



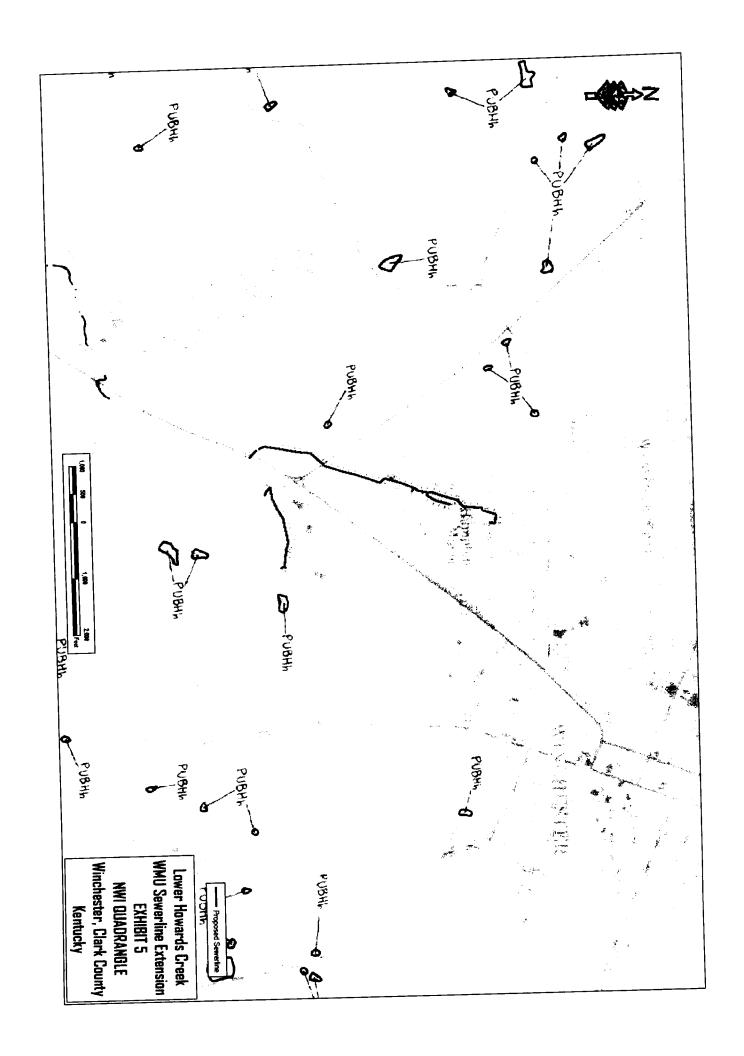
**Attachment 3** 

Soils Map

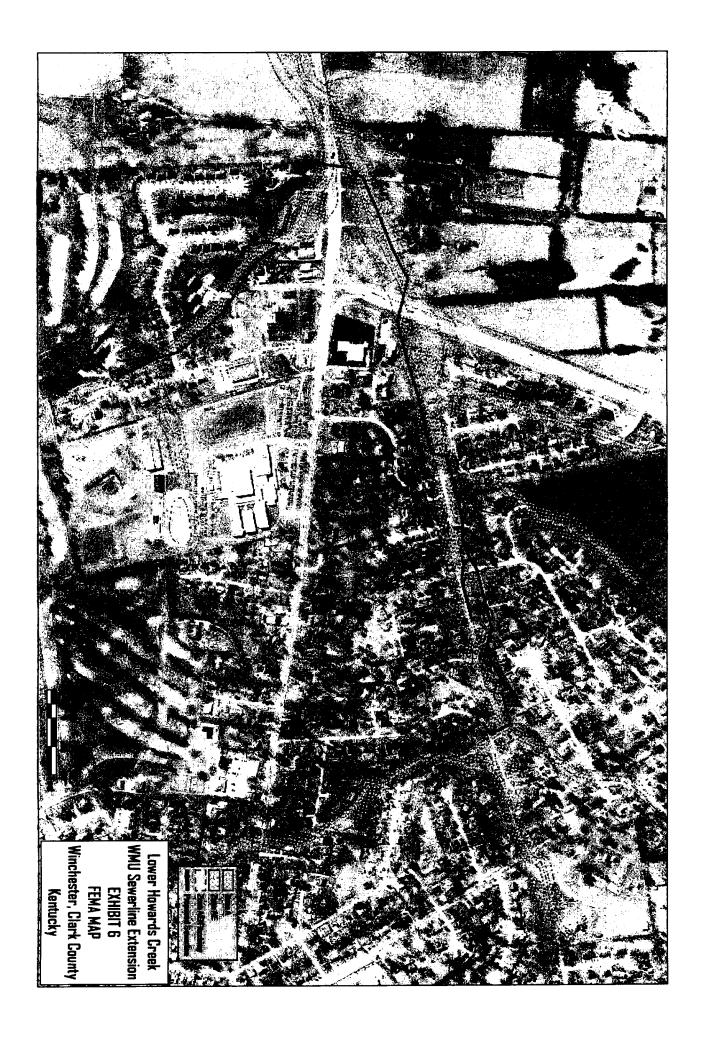


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National Wetland Inventory Map

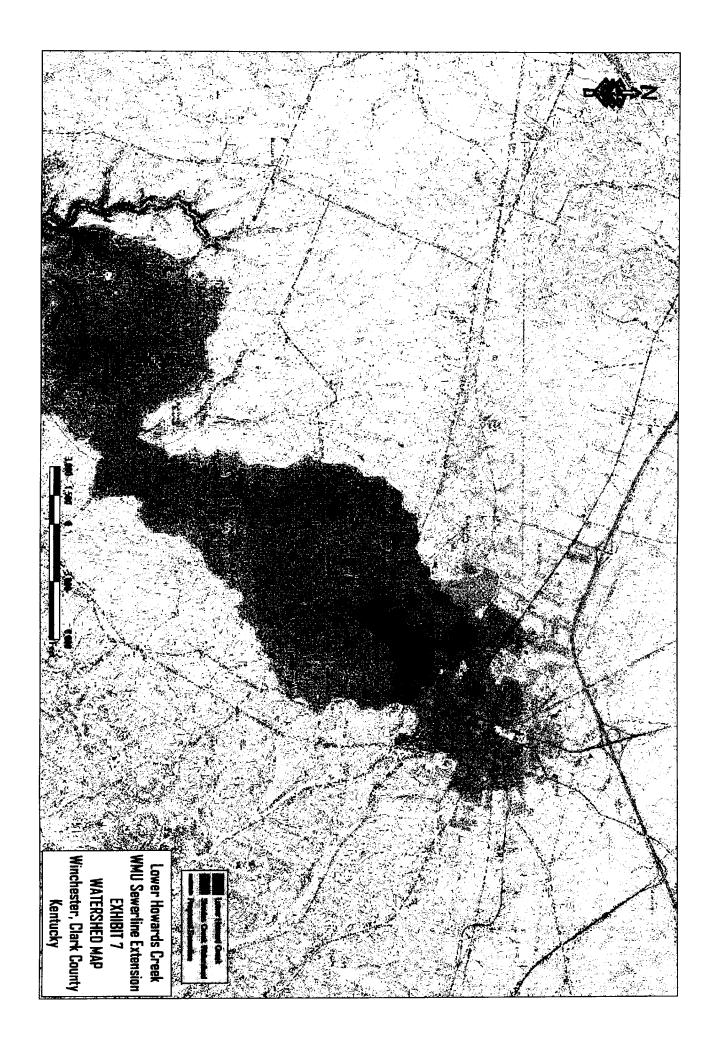


# Attachment 5 FEMA Floodplain Map



### **Attachment 6**

Watershed Map



# Attachment 7 Existing Land Use Photos

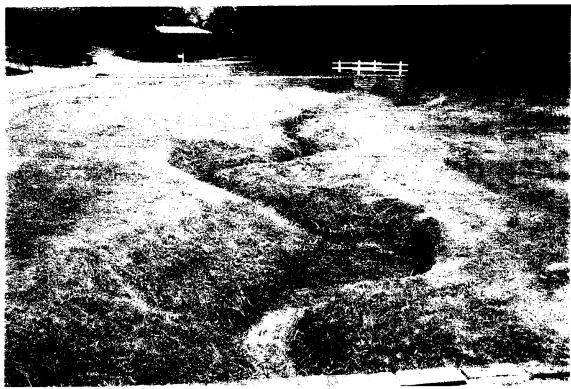


Photo 1. Representative photo of urban/residential land-use



Photo 2. Representative photo of urban/residential land-use



Photo 3. Representative photo of urban/residential land-use



Photo 4. Representative photo of urban land-use



Photo 5. Representative photo of urban/residential land-use



Photo 6. Representative photo of urban/residential land-use

## **Attachment 8**

Wetland No. 1 Photos



Photo 1. Representative photo of Wetland No. 1

# Attachment 9 Wetland No. 2 Photos



Photo 1. Representative photo of Wetland No. 2



Photo 2. Representative photo of Wetland No. 2

Attachmen	t	10
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Photos of Proposed Stream Crossing Locations



Photo 1. Representative photo of Stream Crossing 01





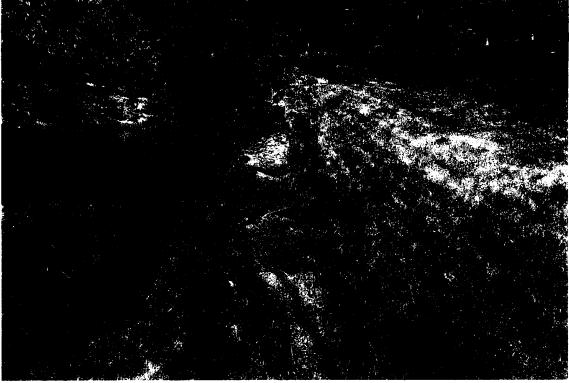


Photo 4. Stream Crossing 04



Photo 5. Stream Crossing 05

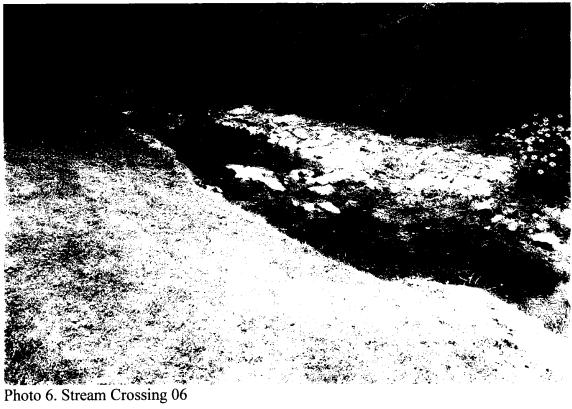




Photo 7. Representative photo of Stream Crossing 07



Photo 8. Representative photo of Stream Crossing 08



Photo 9. Stream Crossing 09





Photo 11. Stream Crossing 11



Photo 12. Stream Crossing 12

Attachment	1	1
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Data Form Routine Wetland Determination (1987 COE Wetland Delineation Manual)

## Data Form Routine Wetland Determination (1987 COE Wetland Delineation Manual)

oject/Site: Hampton / Vaught		and the same of th		1	/28 /08 lar K	
pilcamowner. Doyle				State: K		
vestigator: JJ + LH	112018	92			re No.: <u> </u>	0-01
165 746495 long	(Circle)	ES NO			ID: レ	
Normal Circumstances Exist?		NO NO			-	
the site significantly disturbed?		res (NO)		1		
the area a Problem Area?	Y	TES (NO)		1.00.10		
xplain, If needed, explain on reverse.)						
egetation: Dominant Plant Species		(0)	- N		Ctrotum	Indicate
ommon Name			c Name)		Stratum	Fac +
Curly Dock	KUY	ner a	ispus		herb	Facw
Black Willow		<u>lix nig</u>	314			FALU
Fescue	Fee	sture 5	p. offici		herb	
Dandilion	Tar	axacun	n offici	male	herb	FACU
Purple clover	Tris	folium	prater	<u>15e</u>	herb_	FACO
Umbelliphera			•		herb	<del> </del>
Dock	Run	nex Sp.			harb	Fac+
- F - V - D					1 1	
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3					l l	1
3						
4						
	, or FAC	50°%	o			
4 5 6 Percent of Dominant Species that are OBL, FACW excluding FAC-).	, or FAC	50%	0			
4 5 6 Percent of Dominant Species that are OBL, FACW excluding FAC-). Remarks:						
5 6 Percent of Dominant Species that are OBL, FACW excluding FAC-). Remarks:  Hydrology  (Place a check mark next to those that a		Wetland Hy	drology Indic	cators:	and the second s	
4 5 6 Percent of Dominant Species that are OBL, FACW excluding FAC-). Remarks:  Hydrology  (Place a check mark next to those that a Recorded Data (Describe in Remarks):		Wetland Hy (Place a che	drology Indic	cators: to those that a	pply)	
5 6 Percent of Dominant Species that are OBL, FACW excluding FAC-). Remarks:  Hydrology  (Place a check mark next to those that a		Wetland Hy	drology Indic ck mark next icators:	cators: to those that a	pply)	
4 5 6 Percent of Dominant Species that are OBL, FACW excluding FAC-). Remarks:  Hydrology  (Place a check mark next to those that a Recorded Data (Describe in Remarks):		Wetland Hy (Place a che	drology Indic ack mark next licators: Inundated	to those that a		
4 5 6 Percent of Dominant Species that are OBL, FACW excluding FAC-). Remarks:  Hydrology  (Place a check mark next to those that a Recorded Data (Describe in Remarks):	apply)	Wetland Hy (Place a che	drology Indic ock mark next icators: Inundated Saturated i	to those that a in Upper 12 In		
4 5 6 Percent of Dominant Species that are OBL, FACW excluding FAC-). Remarks:  Hydrology  (Place a check mark next to those that a Recorded Data (Describe in Remarks): Stream, Lake, or Tide GaugeAerial Photographs	apply)	Wetland Hy (Place a che	drology Indic ick mark next icators: Inundated Saturated i Water Marl	to those that a in Upper 12 In ks		
4 5 6 Percent of Dominant Species that are OBL, FACW excluding FAC-). Remarks:  Hydrology  (Place a check mark next to those that a Recorded Data (Describe in Remarks): Stream, Lake, or Tide GaugeAerial Photographs	apply)	Wetland Hy (Place a che	drology Indic ick mark next icators: Inundated Saturated i Water Marl Drift Lines	to those that a in Upper 12 In ks		
4 5 6 Percent of Dominant Species that are OBL, FACW excluding FAC-). Remarks:  Hydrology  (Place a check mark next to those that a Recorded Data (Describe in Remarks):	apply)	Wetland Hy (Place a che	drology Indic ick mark next icators: Inundated Saturated i Water Marl Drift Lines Sediment I	to those that a in Upper 12 In ks Deposits	ches	
4 5 6 Percent of Dominant Species that are OBL, FACW excluding FAC-). Remarks:  Hydrology  (Place a check mark next to those that a Recorded Data (Describe in Remarks):	apply)	Wetland Hy (Place a che Primary Ind	drology Indic ock mark next icators: Inundated Saturated i Water Marl Drift Lines Sediment I Drainage F	to those that a in Upper 12 In ks Deposits Patterns in We	ches	
4 5 6 Percent of Dominant Species that are OBL, FACW excluding FAC-). Remarks:  Hydrology  (Place a check mark next to those that a Recorded Data (Describe in Remarks):	apply)	Wetland Hy (Place a che Primary Ind	drology Indic ock mark next icators: Inundated Saturated i Water Marl Drift Lines Sediment I Drainage F Indicators (2	to those that a in Upper 12 In ks Deposits Patterns in We	ches etlands	oche:
4 5 6 Percent of Dominant Species that are OBL, FACW excluding FAC-). Remarks:  Hydrology  (Place a check mark next to those that a Recorded Data (Describe in Remarks):	apply)	Wetland Hy (Place a che Primary Ind	drology Indic ock mark next icators: Inundated Saturated i Water Marl Drift Lines Sediment I Drainage F Indicators (2 Oxidized F	to those that a in Upper 12 In ks Deposits Patterns in We t or more): Root Channels	ches	nches
4 5 6 Percent of Dominant Species that are OBL, FACW excluding FAC-). Remarks:  Hydrology  (Place a check mark next to those that a Recorded Data (Describe in Remarks):	apply)	Wetland Hy (Place a che Primary Ind	drology Indicators: Inundated Saturated if Water Marl Drift Lines Sediment If Drainage F Indicators (2) Oxidized F	to those that a in Upper 12 In ks Deposits Patterns in We t or more): Root Channels ned Leaves	ches etlands	nches
4 5 6 Percent of Dominant Species that are OBL, FACW excluding FAC-). Remarks:  Hydrology  (Place a check mark next to those that a Recorded Data (Describe in Remarks):	apply)	Wetland Hy (Place a che Primary Ind	drology Indicators: Inundated Saturated i Water Marl Drift Lines Sediment I Drainage F Indicators (2 Oxidized F Water-stai Local Soil	to those that a in Upper 12 In ks Deposits Patterns in We t or more): Root Channels ned Leaves Survey Data	ches etlands	nches
4 5 6 Percent of Dominant Species that are OBL, FACW excluding FAC-). Remarks:  Hydrology  (Place a check mark next to those that a Recorded Data (Describe in Remarks):	apply)	Wetland Hy (Place a che Primary Ind	drology Indicators: Inundated Saturated i Water Marl Drift Lines Sediment I Drainage F Indicators (2 Oxidized F Water-stai Local Soil	to those that a in Upper 12 In ks Deposits Patterns in We or more): Root Channels ned Leaves Survey Data ral Test	ches etlands s in upper 12 in	nches
4 5 6 Percent of Dominant Species that are OBL, FACW excluding FAC-). Remarks:  Hydrology  (Place a check mark next to those that a Recorded Data (Describe in Remarks):	apply)	Wetland Hy (Place a che Primary Ind	drology Indicators: Inundated Saturated i Water Marl Drift Lines Sediment I Drainage F Indicators (2 Oxidized F Water-stai Local Soil	to those that a in Upper 12 In ks Deposits Patterns in We t or more): Root Channels ned Leaves Survey Data	ches etlands s in upper 12 in	nches

ap Unit Nar	ne			Drainage Class	
eries and F	Phase):		And the second s	19.645	Mark the state of
	Santa arman sam Va				
xonomy (S	subgroup):		· · · · · · · · · · · · · · · · · · ·		
ofile De <b>scr</b>	ription:				
Depth	Horizon	Matrix Color	Mottle Colors	Mottle Abundance	Texture, Concretions, etc.
(ln)	ı ————————————————————————————————————	(Munsell Moist)	(Munsell Moist)	T	
0-7		10 YR 4/2	10 110 112	10- 1- 1-	loamy / grave)
7-16		10 YR 5/4	10 YB 6/2	MIGOUIFAMI	TOAMY CALL
dric Sail b	ndicators:	(Place a che	eck mark next to those that ap	l (vlac	
unc son n	Histosol	(; 1200 d 011c	on man non to those that ap	Concretions	
	Histic Epip	pedon		High Organi	c Content in Surface Layer
	Sulfidic O			Organic Stre	eaking in Sandy Soils
	Aquic Moi			Listed on Lo	ocal Hydric Soils List
	Reducing				ational Hydric Soils List
	Gleyed or	Low-Chroma Colors		Other (Expla	ain in Remarks)
emarks:					
Vetland C	Determinatio				
	Determination Polysterion Poly			La Abia Compalia	Doint Within a Watton d2
ydrophytic	Vegetation P	resent? Yes		Is this Samplii	ng Point Within a Wetland?
ydrophytic		resent? Yes		Is this Samplii	ng Point Within a Wetland? (Circle)
ydrophytic Vetland Hyd	Vegetation P	nt? Yes No			<del>-</del>
ydrophytic Vetland Hyd	Vegetation P	resent? Yes			(Circle)
ydrophytic Vetland Hyd	Vegetation P	nt? Yes No			(Circle)
ydrophytic Vetland Hyd Iydric Soils	Vegetation P	nt? Yes No			(Circle)
ydrophytic Vetland Hyd Iydric Soils	Vegetation P	nt? Yes No			(Circle)
ydrophytic Vetland Hyd Iydric Soils	Vegetation P	nt? Yes No			(Circle)
ydrophytic Vetland Hyd Iydric Soils Remarks:	Vegetation P	resent? Yes No nt? Yes No Yes No			(Circle)
ydrophytic Vetland Hyd Iydric Soils	Vegetation P	resent? Yes No nt? Yes No Yes No			(Circle)
ydrophytic Vetland Hyd Iydric Soils Remarks:	Vegetation P	resent? Yes No nt? Yes No Yes No			(Circle)
ydrophytic Vetland Hyd Iydric Soils Remarks:	Vegetation P	resent? Yes No nt? Yes No Yes No	wards wards		(Circle)
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ydrophytic Vetland Hyd Iydric Soils Remarks:	Vegetation P	resent? Yes No nt? Yes No Yes No	wards wards	Y	(Circle)
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ydrophytic Vetland Hyd Iydric Soils Remarks:	Vegetation P	resent? Yes No  Yes No  Yes No	wards wards		(Circle)
ydrophytic Vetland Hyd Iydric Soils Remarks:	Vegetation P	resent? Yes No nt? Yes No Yes No	wards wards	Y	(Circle)

### Data Form Routine Wetland Determination PRINCE Wetland Delineation Manual)

roject/Site: Hampton / Vaught			Date: 7	28/08	
nnlicant/Owner: WINU			County: C	lack	
vestigator: Jeremy Jackson and	Lucas Hill		State: K)		
it 16 746037 long	420704	7	Sampling Si	ite No.: <u></u>	P- <i>02</i>
o Normal Circumstances Exist?		ES) NO		ID: V	
the site significantly disturbed?		ES NO	Transect ID:		
the area a Problem Area?		ES MO	Plot ID:	_	
Explain, If needed, explain on reverse.)			U	vetland *	2
/egetation: Dominant Plant Species					
Common Name		(Scientific Name)		Stratum	Indica
	Car	ex 5p.		herb	OBL
Sedges				herb	OB
husnes	Coch	cus sp. vca officinale	·	herb	Fac
Fesave				herb	FAC
Thistle	Q +	ium sp. Tomm Sodoider		herb	OBL
Ditch Stone Crop				herb	FAC
Fronweed	O.	nonia Sp. 2 multiflera		harb	FACL
Rosa multiflora	nos/	2 THUITINE			T
3					
10					1
11					1
12			<u> </u>		+
13	1				
13					1
14					
14 15 16					
14 15	V, or FAC	51%			
14 15 16 Percent of Dominant Species that are OBL, FACV (excluding FAC-).	V, or FAC	57%			
14 15 16 Percent of Dominant Species that are OBL, FACV	N, or FAC	57%			
14 15 16 Percent of Dominant Species that are OBL, FACV (excluding FAC-).	V, or FAC	57%			
14 15 16 Percent of Dominant Species that are OBL, FACV (excluding FAC-).	V, or FAC	57%			
14 15 16 Percent of Dominant Species that are OBL, FACV (excluding FAC-).	V, or FAC	57%			
14 15 16 Percent of Dominant Species that are OBL, FACV (excluding FAC-). Remarks: Hydrology		57%			
14 15 16 Percent of Dominant Species that are OBL, FACV (excluding FAC-). Remarks:		Wetland Hydrology Inc			
14 15 16 Percent of Dominant Species that are OBL, FACV (excluding FAC-). Remarks: Hydrology		Wetland Hydrology Ind (Place a check mark ne		apply)	
14 15 16 Percent of Dominant Species that are OBL, FACV (excluding FAC-). Remarks:  Hydrology  (Place a check mark next to those that		Wetland Hydrology Inc (Place a check mark ne Primary Indicators:	ext to those that a	apply)	
14 15 16 Percent of Dominant Species that are OBL, FACV (excluding FAC-). Remarks:  Hydrology  (Place a check mark next to those that Recorded Data (Describe in Remarks):		Wetland Hydrology Inc (Place a check mark ne Primary Indicators: Inundate	ext to those that a		
14 15 16 Percent of Dominant Species that are OBL, FACV (excluding FAC-). Remarks:  Hydrology  (Place a check mark next to those thatRecorded Data (Describe in Remarks):Stream, Lake, or Tide Gauge		Wetland Hydrology Ind (Place a check mark ne Primary Indicators: Inundate	ext to those that a		
14 15 16 Percent of Dominant Species that are OBL, FACV (excluding FAC-). Remarks:  Hydrology  (Place a check mark next to those that Recorded Data (Describe in Remarks):Stream, Lake, or Tide GaugeAerial Photographs		Wetland Hydrology Inc (Place a check mark ne Primary Indicators: Inundate	ext to those that a ed d in Upper 12 In		
14 15 16 Percent of Dominant Species that are OBL, FACV (excluding FAC-). Remarks:  Hydrology  (Place a check mark next to those that Recorded Data (Describe in Remarks):Stream, Lake, or Tide GaugeAerial Photographs		Wetland Hydrology Inc (Place a check mark ne Primary Indicators: Inundate Vater Ma	ext to those that a ed d in Upper 12 In arks es		
14 15 16 Percent of Dominant Species that are OBL, FACV (excluding FAC-). Remarks:  Hydrology  (Place a check mark next to those that Recorded Data (Describe in Remarks): Stream, Lake, or Tide Gauge Aerial Photographs Other: explain		Wetland Hydrology Ind (Place a check mark ne Primary Indicators: Inundate Saturated Water Marchel	ext to those that a ed d in Upper 12 In arks es nt Deposits	nches	
14 15 16 Percent of Dominant Species that are OBL, FACV (excluding FAC-). Remarks:  Hydrology  (Place a check mark next to those that Recorded Data (Describe in Remarks): Stream, Lake, or Tide Gauge Aerial Photographs Other: explain No Recorded Data Available		Wetland Hydrology Ind (Place a check mark ne Primary Indicators: Inundate Saturate Water Mark Drift Line Sedimen	ext to those that a ed d in Upper 12 In arks es nt Deposits e Patterns in We	nches	
14 15 16 Percent of Dominant Species that are OBL, FACV (excluding FAC-). Remarks:  Hydrology  (Place a check mark next to those that Recorded Data (Describe in Remarks):  Stream, Lake, or Tide Gauge Aerial Photographs Other: explain  No Recorded Data Available Field Observations:		Wetland Hydrology Inc (Place a check mark ne Primary Indicators: Inundate Saturate Water Mark Drift Line Sedimen Drainage Secondary Indicators	ext to those that a  ed d in Upper 12 In arks es nt Deposits e Patterns in We (2 or more):	nches etlands	
14 15 16 Percent of Dominant Species that are OBL, FACV (excluding FAC-). Remarks:  Hydrology  (Place a check mark next to those that Recorded Data (Describe in Remarks): Stream, Lake, or Tide Gauge Aerial Photographs Other: explain No Recorded Data Available	apply)	Wetland Hydrology Inc (Place a check mark ne Primary Indicators: Inundate	ext to those that a ed d in Upper 12 In arks es nt Deposits e Patterns in We	nches etlands	ches
14 15 16 Percent of Dominant Species that are OBL, FACV (excluding FAC-). Remarks:  Hydrology  (Place a check mark next to those that Recorded Data (Describe in Remarks): Stream, Lake, or Tide Gauge Aerial Photographs Other: explain  No Recorded Data Available Field Observations:  Depth of Surface Water: (in)	apply)	Wetland Hydrology Inc (Place a check mark ne Primary Indicators: Inundate Saturate Water Ma Drift Line Sedimen Drainage Secondary Indicators	ext to those that a  ed d in Upper 12 In arks es nt Deposits e Patterns in We (2 or more):	nches etlands	ches
14 15 16 Percent of Dominant Species that are OBL, FACV (excluding FAC-). Remarks:  Hydrology  (Place a check mark next to those that Recorded Data (Describe in Remarks):  Stream, Lake, or Tide Gauge Aerial Photographs Other: explain  No Recorded Data Available Field Observations:	None None	Wetland Hydrology Inc (Place a check mark ne Primary Indicators: Inundate Saturate Water Ma Drift Line Sedimen Drainage Secondary Indicators Oxidized	ext to those that a  ed d in Upper 12 In arks es at Deposits e Patterns in We (2 or more):	nches etlands	ches
14 15 16 Percent of Dominant Species that are OBL, FACV (excluding FAC-). Remarks:  Hydrology  (Place a check mark next to those that Recorded Data (Describe in Remarks): Stream, Lake, or Tide Gauge Aerial Photographs Other: explain  No Recorded Data Available Field Observations:  Depth of Surface Water: (in)	apply)	Wetland Hydrology Ind (Place a check mark ne Primary Indicators: Inundate Saturate Water Mark Drift Line Sediment Drainage Secondary Indicators Water-st Local Sc	ext to those that a ed d in Upper 12 In arks es nt Deposits e Patterns in We (2 or more): d Root Channels tained Leaves	nches etlands	ches

SOILS							
lap Unit Nar						Drainage Clas	s:
eries and F	Phase):				<del></del>		
ixonomy (S	iubgroup):						
				····		<u> </u>	
rofile Descr	iption:						
Depth	Horizon	Mat	rix Color	Mottle	Colors	Mottle	Texture, Concretions, etc.
(ln)	HOHZOH	(Mun:	sell Mojst)	(Munsel	ll Moist)	Abundance	TOXICIO, CONGIGUIONO, CIO.
0-5	<i>_</i>	10 yR	4/2				
10-16		IOVR	411	IOVR	5/6	many Fain	t Silty Clay
2					7	7,	
dric Soil I	l ndicators:	1	(Place a che	ck mark next to	those that a		
uno don u	Histosol		(1 1000 0 0110	on many none to		Concretion	S
		nadon					nic Content in Surface Layer
	Histic Epi						reaking in Sandy Soils
	Sulfidic O		_				
	Aquic Mo		ıe				ocal Hydric Soils List
	Reducing						National Hydric Soils List
	✓ Gleyed or	Low-Chrom	a Colors			Other (Exp	lain in Remarks)
emarks:							
	Determinati	on					
Vetland E	Determinati Vegetation P		Yes) No				
Vetland C	Vegetation P	resent?				Is this Sampl	ing Point Within a Wetland?
Vetland C		resent?	Yes No			Is this Sampl	ing Point Within a Wetland? (Circle)
/etland E	Vegetation P	resent?	Yes No				(Circle)
/etland E /drophytic etland Hyc	Vegetation P	resent?					
Vetland E ydrophytic /etland Hyd	Vegetation P	resent?	Yes No				(Circle)
Vetland E ydrophytic Vetland Hyd lydric Soils	Vegetation P	resent?	Yes No				(Circle)
Vetland E ydrophytic Vetland Hyd lydric Soils	Vegetation P	resent?	Yes No				(Circle)
/etland E ydrophytic /etland Hyd ydric Soils	Vegetation P	resent?	Yes No				(Circle)
Vetland E ydrophytic Vetland Hyd lydric Soils	Vegetation P	resent?	Yes No				(Circle)
Vetland E lydrophytic Vetland Hyd lydric Soils	Vegetation P	resent?	Yes No			(	(Circle)
Vetland E ydrophytic Vetland Hyd lydric Soils remarks:	Vegetation P	resent?	Yes No	Hand 2	Museo	(	(Circle)
Vetland E lydrophytic Vetland Hyd lydric Soils Remarks:	Vegetation P	resent?	Yes No	Handa;	mzb-o	(	(Circle)
Vetland E lydrophytic Vetland Hyd Hydric Soils Remarks:	Vegetation P Irology Prese Present?	resent?	Yes No Yes No		X mak-o	(	(Circle)
lydrophytic	Vegetation P Irology Prese Present?	resent?	Yes No Yes No		XXXP-O	(	(Circle)
Vetland E lydrophytic Vetland Hyd Hydric Soils Remarks:	Vegetation P Irology Prese Present?	resent?	Yes No Yes No		x mak-o	(	(Circle)
Vetland E lydrophytic Vetland Hyd Hydric Soils Remarks:	Vegetation P Irology Prese Present?	resent?	Yes No		LUSP-O	(	(Circle)
Vetland E lydrophytic Vetland Hyd Hydric Soils Remarks:	Vegetation P Irology Prese Present?	resent?	Yes No Yes No		x x	(	(Circle)
Vetland E lydrophytic Vetland Hyd Hydric Soils Remarks:	Vegetation P Irology Prese Present?	resent?	Yes No Yes No		x x	(	(Circle)
Vetland E lydrophytic Vetland Hyd lydric Soils Remarks:	Vegetation P Irology Prese Present?	resent?	Yes No Yes No		x /		(Circle)
Vetland E lydrophytic Vetland Hyd lydric Soils Remarks:	Vegetation P Irology Prese Present?	resent?	Yes No Yes No		X Wal-o		(Circle)
Vetland E lydrophytic Vetland Hyd lydric Soils Remarks:	Vegetation P Irology Prese Present?	resent?	Yes No Yes No		X Mab-o	(	(Circle)
Vetland E ydrophytic Vetland Hyd lydric Soils Remarks:	Vegetation P Irology Prese Present?	resent?	Yes No Yes No		WSP-O		(Circle)

### Data Form Routine Wetland Determination 987 COF Wetland Delineation Manual

	COE Wetland D	elineation Man	<u>uaij</u>	120100	
oject/Site: Hampton / Vaught			Date:Z	128/08	
			County:C	Jack	V V
vestigator: Jeremy Jackson and	Lucas Hill		State: U	inchester,	<u> </u>
vestigator: Jereny Saekson and tong	42070			ite No.: <u> </u>	- 03
o Normal Circumstances Exist?	(Circle)	S) NO	Community		
the site significantly disturbed?	YE	ES NO	Transect ID	•	
the area a Problem Area?	YE	ES (NO)	Plot ID:		4 4
Explain, If needed, explain on reverse.)				Wetland "	2
egetation: Dominant Plant Species					
Common Name		(Scientific Nam		Stratum	Indicato
fescue	festuca	officina	ale	heis	Facu
Vetch	Viscia		· · · · · · · · · · · · · · · · · · ·	herb	Upl
Veich					<u> </u>
					<b> </b>
10					
11					
12					
13		· · · · · · · · · · · · · · · · · · ·			
14					
15					
16 CPL FAC	N or EAC				
Percent of Dominant Species that are OBL, FAC	W, OF PAC				
(excluding FAC-). Remarks:					
Nemarks.					
Hydrology					
(Place a check mark next to those that	apply)	Wetland Hydrology	Indicators:		
Recorded Data (Describe in Remarks):	ļ	(Place a check mark	k next to those that a	apply)	
Stream, Lake, or Tide Gauge		Primary Indicators	:		
Aerial Photographs		lnunc	lated		
Other: explain		Satur	ated in Upper 12 Ir	nches	
		Wate	r Marks		
No Recorded Data Available		Drift	Lines		
		Sedir	ment Deposits		
Field Observations:		D	nage Patterns in W	etlands	
		Drain			
Field Observations:	None	Secondary Indicat	ors (2 or more):		
	1101-	Secondary Indicat		s in upper 12 in	ches
Field Observations:  Depth of Surface Water: (in)	1101-	Secondary Indicat	ors (2 or more): ized Root Channel er-stained Leaves	s in upper 12 in	ches
Field Observations:	None None	Secondary Indicat Oxid	ized Root Channel er-stained Leaves	s in upper 12 in	ches
Field Observations:  Depth of Surface Water: (in)  Depth of Free Water in Pit: (in)	1101-	Secondary Indicat Oxidi Wate	ized Root Channel rr-stained Leaves Il Soil Survey Data	s in upper 12 in	ches
Field Observations:  Depth of Surface Water: (in)	1101-	Secondary Indicat Oxidi Wate Loca	ized Root Channel er-stained Leaves		ches

SOILS	v			
Map Unit Name			Drainage Class:	
Series and Phase):				
	_			
axonomy (Subgroup)				
Destile Depositations				
Profile Description:  Depth	Matrix Color	Mottle Colors	Mottle	
(In)	n (Munsell Moist)	(Munsell Moist)	Abundance	Texture, Concretions, etc.
0-16	10 yr 3/3		T	
<u> </u>	1971			
lydric Soil Indicators:	(Place a che	ck mark next to those that a		
Histo:			Concretions	
	Epipedon			Content in Surface Layer
Sulfid			-	ting in Sandy Soils
	Moisture Regime		Listed on Local	
	cing Conditions			in Remarks)
Gleye	ed or Low-Chroma Colors		Other (Explain	in Remarks)
Wetland Determir Hydrophytic Vegetatio				
Wetland Hydrology Pi	resent? Yes No			Point Within a Wetland? (Circle)
Hydric Soils Present?	Yes No		Yes	<u> </u>
Remarks:				
Drawing	ı.\eHa	nd 2 N X WSP-1	03///	
	Cieok			
	Lower Howard's Creek	and #1	1	
		/ /	Boone Av	ęnue_
		<del>·</del>		
		/ / /		

#### Data Form Routine Wetland Determination (1987 COE Wetland Delineation Manual)

vestigator: Jeremy Jackson and	was Hi	Д	State:	トソ Site No.: いろ	0-04
t 6 S 746060 long 4	1206961	0	Communit		P-U7
Normal Circumstances Exist?		YES NO		D:	.,,
the site significantly disturbed?		YES (NO) YES (NO)	Plot ID:		
the area a Problem Area?		YES (NO)	Plot ib	WeHand#	1
xplain, If needed, explain on reverse.)				WETIANA	
egetation: Dominant Plant Species					Indica
ommon Name		(Scientific Name	}	Stratum	<del> </del>
Sedae	Ca	rex		herb	Fach
Dock	Bu	men Crispus		herb	Fact
Rushes	Ju	ncus effusu:	5	herb	Facu
					<del> </del>
					<del> </del>
					-
					-
					+
0					
1					-
12					<del> </del>
13					+
14					
15					
	i				
Percent of Dominant Species that are OBL, FACW, (excluding FAC-).	, or FAC	100%			
16 Percent of Dominant Species that are OBL, FACW, (excluding FAC-). Remarks:	or FAC	100%			
Percent of Dominant Species that are OBL, FACW, (excluding FAC-). Remarks: Hydrology					
Percent of Dominant Species that are OBL, FACW, (excluding FAC-). Remarks:  Hydrology  (Place a check mark next to those that a		Wetland Hydrology In	ndicators:	t apply)	
Percent of Dominant Species that are OBL, FACW, (excluding FAC-). Remarks:  Hydrology  (Place a check mark next to those that a Recorded Data (Describe in Remarks):		Wetland Hydrology Ir (Place a check mark n	ndicators: ext to those that	t apply)	
Percent of Dominant Species that are OBL, FACW, (excluding FAC-). Remarks:  Hydrology  (Place a check mark next to those that a Recorded Data (Describe in Remarks):  Stream, Lake, or Tide Gauge		Wetland Hydrology In (Place a check mark n Primary Indicators:	ext to those that	t apply)	
Percent of Dominant Species that are OBL, FACW, (excluding FAC-).  Remarks:  Hydrology  (Place a check mark next to those that a Paccorded Data (Describe in Remarks): Stream, Lake, or Tide GaugeAerial Photographs		Wetland Hydrology Ir (Place a check mark n Primary Indicators:	ext to those that ed		
Percent of Dominant Species that are OBL, FACW, (excluding FAC-). Remarks:  Hydrology  (Place a check mark next to those that a Recorded Data (Describe in Remarks):  Stream, Lake, or Tide Gauge		Wetland Hydrology Ir (Place a check mark n Primary Indicators: Inundat	ext to those that ed ed in Upper 12		
Percent of Dominant Species that are OBL, FACW, (excluding FAC-).  Remarks:  Hydrology  (Place a check mark next to those that a Recorded Data (Describe in Remarks): Stream, Lake, or Tide GaugeAerial PhotographsOther: explain		Wetland Hydrology Ir (Place a check mark n Primary Indicators: Inundat	ext to those that red ed in Upper 12 Marks		
Percent of Dominant Species that are OBL, FACW, (excluding FAC-).  Remarks:  Hydrology  (Place a check mark next to those that a Recorded Data (Describe in Remarks):  Stream, Lake, or Tide Gauge Aerial Photographs Other: explain		Wetland Hydrology Ir (Place a check mark n Primary Indicators: Inundat Saturat Water M	ext to those that red ed in Upper 12 Marks		
Percent of Dominant Species that are OBL, FACW, (excluding FAC-).  Remarks:  Hydrology  (Place a check mark next to those that a Recorded Data (Describe in Remarks): Stream, Lake, or Tide GaugeAerial PhotographsOther: explain		Wetland Hydrology Ir (Place a check mark n Primary Indicators: Inundat Saturat Water M	ext to those that ed ed in Upper 12 Marks nes	Inches	
Percent of Dominant Species that are OBL, FACW, (excluding FAC-).  Remarks:  Hydrology  (Place a check mark next to those that a part of the content of the	pply)	Wetland Hydrology Ir (Place a check mark n Primary Indicators: Inundat Saturat Water M Drift Lin Sedime Drainag	ext to those that ed ed in Upper 12 Marks nes ent Deposits ge Patterns in V s (2 or more):	Inches Vetlands	
Percent of Dominant Species that are OBL, FACW, (excluding FAC-).  Remarks:  Hydrology  (Place a check mark next to those that a Recorded Data (Describe in Remarks):  Stream, Lake, or Tide Gauge Aerial Photographs Other: explain		Wetland Hydrology Ir (Place a check mark n Primary Indicators: Inundat Saturat Water M Drift Lin Sedime Drainag Secondary Indicator	ext to those that ed ed in Upper 12 Marks nes ent Deposits ge Patterns in V s (2 or more):	Inches	iches
Percent of Dominant Species that are OBL, FACW, (excluding FAC-).  Remarks:  Hydrology  (Place a check mark next to those that a Recorded Data (Describe in Remarks):	pply)	Wetland Hydrology Ir (Place a check mark n Primary Indicators: Inundat Saturat Water M Drift Lin Sedime Drainag Secondary Indicator	ext to those that ed ed in Upper 12 Marks nes ent Deposits ge Patterns in V s (2 or more):	Inches Vetlands els in upper 12 in	nches
Percent of Dominant Species that are OBL, FACW, (excluding FAC-).  Remarks:  Hydrology  (Place a check mark next to those that a part of the content of the	None	Wetland Hydrology In (Place a check mark n Primary Indicators: Inundat Saturat Water M Drift Lin Sedime Drainag Secondary Indicator	ext to those that ed in Upper 12 Marks nes ent Deposits ge Patterns in V s (2 or more): ed Root Channe	Inches Vetlands els in upper 12 in	iches
Percent of Dominant Species that are OBL, FACW, (excluding FAC-).  Remarks:  Hydrology  (Place a check mark next to those that a Recorded Data (Describe in Remarks):  Stream, Lake, or Tide Gauge Aerial Photographs Other: explain  No Recorded Data Available  Field Observations:  Depth of Surface Water: (in)	pply)	Wetland Hydrology In (Place a check mark no Primary Indicators: Inundate Saturate Water Mark no Drift Line Sedime Drainage Secondary Indicator Secondary Indicator Water-second Second S	ext to those that ed ed in Upper 12 Marks nes ent Deposits ge Patterns in V s (2 or more): ed Root Channe stained Leaves	Inches Vetlands els in upper 12 in	aches
Percent of Dominant Species that are OBL, FACW, (excluding FAC-).  Remarks:  Hydrology  (Place a check mark next to those that a Recorded Data (Describe in Remarks):	None	Wetland Hydrology Ir (Place a check mark not Primary Indicators: Inundate Saturate Water Model Drift Ling Sedime Drainage Secondary Indicator Water-second Second S	ext to those that ed ed in Upper 12 Marks nes ent Deposits ge Patterns in V s (2 or more): ed Root Channe stained Leaves Goil Survey Dat	Inches Vetlands els in upper 12 in a	iches
Percent of Dominant Species that are OBL, FACW, (excluding FAC-).  Remarks:  Hydrology  (Place a check mark next to those that a Recorded Data (Describe in Remarks):  Stream, Lake, or Tide Gauge Aerial Photographs Other: explain  No Recorded Data Available  Field Observations:  Depth of Surface Water: (in)	None	Wetland Hydrology Ir (Place a check mark not Primary Indicators: Inundate Saturate Water Model Drift Ling Sedime Drainage Secondary Indicator Water-second Second S	ext to those that ed ed in Upper 12 Marks nes ent Deposits ge Patterns in V s (2 or more): ed Root Channe stained Leaves Soil Survey Dat eutral Test	Inches Vetlands els in upper 12 in a	iches

lap Unit Name					Ini.	
					Drainage Class	
Series and Phase):				<del></del> -		***
axonomy (Subgroup):						
rofile Description:			Mottle	Calava	Mottle	
Depth Horizon		trix Color nsell Moist)	(Munsel		Abundance	Texture, Concretions, etc.
(in)		1 R 4/1	(munscr	i moisej		silty clau
0-7 - 8-16 -	10 )	1 R 3/1	IOVR	4/4	Few/ Faint	Silty clay
, ,,,	10-7	/_/3/	1011			
			<u> </u>			
dric Soil Indicators:	-1	(Place a che	ck mark next to	those that a	pply) Concretions	:
Histos Histic						ic Content in Surface Layer
Sulfidi						eaking in Sandy Soils
	Moisture Regi	me				ocal Hydric Soils List
	ing Conditions				Listed on N	ational Hydric Soils List
	d or Low-Chro				Other (Expl	ain in Remarks)
Remarks:						
Wetland Determin	ation					
		Yes) No				
		(Yes) No			ls this Sampli	ng Point Within a Wetland?
Wetland Determin Hydrophytic Vegetatio Wetland Hydrology Pr	n Present?	Yes No			ls this Sampli	ng Point Within a Wetland? (Circle)
Hydrophytic Vegetatio Netland Hydrology Pr	n Present?	Yes No				(Circle)
Hydrophytic Vegetatio Wetland Hydrology Pr	n Present?					<del>-</del>
Hydrophytic Vegetatio Wetland Hydrology Pr Hydric Soils Present?	n Present?	Yes No				(Circle)
Hydrophytic Vegetatio Wetland Hydrology Pr Hydric Soils Present?	n Present?	Yes No				(Circle)
Hydrophytic Vegetatio Wetland Hydrology Pr Hydric Soils Present?	n Present?	Yes No				(Circle)
Hydrophytic Vegetatio Wetland Hydrology Pr Hydric Soils Present?	n Present?	Yes No				(Circle)
Hydrophytic Vegetatio Wetland Hydrology Pr Hydric Soils Present? Remarks:	n Present?	Yes No				(Circle)
Hydrophytic Vegetatio Netland Hydrology Pr Hydric Soils Present? Remarks:	n Present?	Yes No	eHard 2/			(Circle)
Hydrophytic Vegetatio Wetland Hydrology Pr Hydric Soils Present? Remarks:	n Present?	Yes No	Live Harro 2/			(Circle)
Hydrophytic Vegetation  Netland Hydrology Produced Hydric Soils Present?  Remarks:  Drawing	n Present?	Yes No Yes No	LueHand 2/			(Circle)
Hydrophytic Vegetatio Wetland Hydrology Pr Hydric Soils Present? Remarks: Drawing	n Present?	Yes No Yes No				(Circle)
Hydrophytic Vegetatio Wetland Hydrology Pr Hydric Soils Present? Remarks:  Drawing	n Present?	Yes No Yes No				(Circle)
Hydrophytic Vegetatio Wetland Hydrology Pr Hydric Soils Present? Remarks: Drawing	n Present?	Yes No Yes No				(Circle)
Hydrophytic Vegetatio Wetland Hydrology Pr Hydric Soils Present? Remarks: Drawing	n Present?	Yes No Yes No		Hass R.		(Circle)
Hydrophytic Vegetatio Wetland Hydrology Pr Hydric Soils Present? Remarks: Drawing	n Present?	Yes No Yes No		April 1		(Circle)
Hydrophytic Vegetation  Netland Hydrology Produced Hydric Soils Present?  Remarks:  Drawing	n Present?	Yes No Yes No				(Circle)
Hydrophytic Vegetatio Wetland Hydrology Pr Hydric Soils Present? Remarks: Drawing	n Present?	Yes No Yes No				(Circle)

### Data Form Routine Wetland Determination (1987 COE Wetland Delineation Manual)

Ilos 746063 long 46 Normal Circumstances Exist? (Country the site significantly disturbed? Ithe area a Problem Area? (Country the area a Probl	Dau	(Scientif		County:C  State:K Sampling Sit Community Transect ID:	y te No.: <u>い</u> 3 p ID: <u>ソ</u>	
Ilos 746063 long 46 Normal Circumstances Exist? (Country the site significantly disturbed? Ithe area a Problem Area? (Country the area a Probl	20694 ircle) (Y	(Scientif		Sampling Si Community Transect ID:	te No.: <u>W</u> 3ρ ID: <u>V</u>	
Normal Circumstances Exist? (Conthe site significantly disturbed?  the area a Problem Area?  Explain, If needed, explain on reverse.)  Egetation: Dominant Plant Species  Emmon Name  Queen ann's Lace  Milkwed  Fescue  False bindwed	Dau	(Scientif		Community   Transect ID:	ID: <u>V</u>	
the site significantly disturbed? the area a Problem Area?  xplain, If needed, explain on reverse.) egetation: Dominant Plant Species  common Name  Queen ann's Lace  milkweed  Fescue  False bindwead	Dau	YES NO YES NO (Scientif		Transect ID:		
the area a Problem Area?  Explain, If needed, explain on reverse.)  Egetation: Dominant Plant Species  Emmon Name  Queen ann's Lace  Milkweed  Fescue  False bindwead	Dau	res NO		1	-	
egetation: Dominant Plant Species  ommon Name  Queen ann's Lace  milkweed  Fescue  False bindweed	Dau	(Scientif		PIOUD	/.la D = \	
egetation: Dominant Plant Species  ommon Name  Queen ann's Lace  milkweed  Fescue  False bindweed						#1
milkweed Fescue False bindwead					WETIAND	<u> </u>
Queen ann's Lace milkweed Fescue False bindweed					T	т
milkused Fescus False bindused					Stratum	Indicate
milkueed Fescue False bindueed	Λ	icus c			heb	Upl
False bindused		lepias_			heb	FacU
False bindused		tuca ru			heb	Facu
i i	Cal	ystigia	sepium	L	heb	FAC
Ironweed	Ver	nonia_	<u> 5ρ.`</u>		herb	FAC
						-
0						<del> </del>
1						<u> </u>
2						
3						
4						
5						
6						
Remarks:						
-lydrology						
(Place a check mark next to those that appl	y)	Wetland Hy	drology Indic	ators:		
Recorded Data (Describe in Remarks):		1.		o those that a	oply)	
Stream, Lake, or Tide Gauge		Primary Inc	dicators:			
Aerial Photographs			Inundated			
Other: explain			Saturated in	upper 12 Inc	ches	
			Water Mark	s		
No Recorded Data Available			Drift Lines			
Field Observations:			Sediment D			
				atterns in We	tlands	
Depth of Surface Water: (in)	None None None	Secondary	Indicators (2			
•			Oxidized R	oot Channels	in upper 12 inc	ches
Depth of Free Water in Pit: (in)	None		Water-stair	ed Leaves		
. ,			Local Soil	Survey Data		
Depth of Saturated Soil: (in)	None		FAC-Neutra	ıl Test		
popular or occurred a serie ()			Other (exp	ain in Remar	ks)	

OILS					Drainage Clas	s.	
ap Unit Nam	ne 'Inase):				Dramage Glas	3.	F-49-48-48-48-48-48-48-48-48-48-48-48-48-48-
ines and r	Tiase)						
xonomy (S	ubgroup):						
konomy (o							
ofile Descri	iption:		<u></u>				
Depth	Haviman	Matrix	Color	Mottle Colors	Mottle		Texture, Concretions, etc.
(In)	Horizon	(Munsel	l Moist)	(Munsell Mois	t) Abundance		, 0,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
0-7	_	10 4R	5/3			Lo	amy
7-16		10 4R	5/2			Lo	any
						<u> </u>	
	ndicators:		(Place a check	mark next to those			
	Histosol				Concretion		ent in Surface Layer
	Histic Epip						in Sandy Soils
	Sulfidic Oc						m Sandy Solls dric Solls List
	Aquic Mois				10.7-11.1-1		Hydric Soils List
	Reducing		0.15.55		Cisted on t		=
	Gleyed or	Low-Chroma	Colors		Other (rxt	nam m iv	Gillarks)
marks:							
	Determination Processing Processi		Ves (No.)				
Vetland D	Determination Pi		Yes (No)		Is this Samp	ling Poi	nt Within a Wetland?
Vetland D ydrophytic	Vegetation Pi	resent?	_		Is this Samp		nt Within a Wetland? cle)
Vetland D ydrophytic		resent?	Yes No		Is this Samp		
/etland D ydrophytic etland Hyd	Vegetation Pi	resent?	_		Is this Samp		
Vetland D lydrophytic Vetland Hyd lydric Soils	Vegetation Pi	resent?	Yes No		Is this Samp	(Cir	cle)
Vetland D lydrophytic Vetland Hyd	Vegetation Pi	resent?	Yes No		Is this Samp	(Cir	cle)
Vetland D lydrophytic Vetland Hyd lydric Soils	Vegetation Pi	resent?	Yes No	wetland /		(Cir	cle)
Vetland D ydrophytic Vetland Hyd ydric Soils temarks:	Vegetation Pi	creex wet	Yes No	wettard /		(Cir	cle)
/etland D ydrophytic /etland Hyd ydric Soils emarks:	Vegetation Pidrology Present? Present?	creex wet	Yes No	1		(Cir	cle)



EPA Low Gradient Stream Assessment Data Sheets

Stream Name:	Lower	Howards	Creek		Location: (し)		5. c 01
Station #: 10	+50	Mile:		··· · · · · · · · · · · · · · · · · ·	Basin/Watersh		
LAT.:	,	LONG.:			County: Cla		7.5 TOPO:
Date: 7/28	08 Time:	1:00AM	(PM)		Investigators:	LH	
		Type Sam		Macroinver		Bacteria	
Weather:		Now	Past 24 hours		_	heavy rain in la	ast 7 days?
			θ Heavy Rain	(	Yes)	No SK or	
			o Steady Rain	<u> </u>	Air Temperatu		<b>う</b> .
]			9 Intermittent			in past 24 hours	<u>s. ∝</u> m
5 21		(	θ Clear/Sunny		ZO % Cloud		
P-Che				'Saturation	pH (S.U.)_	Cond	Grab
Instream Wat	ershed	Local Waters					
Features:	1101		urrounding Lan				
Stream Width:		e Surface Mini	_	e Construction		e Forest	
Range of Depti		ө Deep Mining	;	e Commercial		o Pasture / Gra	zing
Average Veloc		e Oil Wells		e Industrial		o Silviculture	
Discharge:	cfs	e Land Dispos	al	ө Row Crops		e Urban Runol	ff / Storm Sewers
Est. Reach Len		L	I	<u> </u>			
Hydraulic Stru			Stream Flow:			Stream Type:	•
e Dams	θ Bridge Abut	ments	ө Dry	e Pooled (	e Low	θ Perennial	θ Intermittent
e Island	θ Waterfalls		e Normal	θ High		e Ephemeral	ө Ѕеер
o Other		<b>B F</b> (==	e Very Rapid α			L	or the
Riparian Veget		Dom. Tree / Sh	irub Taxa	Canopy Cover:			Channel Alterations:
Dominate Type				θ Fully Expose			θ Dredging
	θ Shrubs	_		e Partially Sha			e Channelization
o Grasses	θ Herbaceous	)		e Partially Exp	•		(e Full or e Partial)
Number of Stra				θ Fully Shaded			
Substrate o Est			Riffle_	30 %	Run	<u>10_%</u>	Pool <u>60</u> %
Silt / Clay (< 0	<del></del>		ļ,		,		
Sand (0.06 - 2				<u>o</u>	//	· · · · · · · · · · · · · · · · · · ·	10
Gravel (2 - 64			10		60		60
Cobble (64 - 256 mm)		.30	<b>~</b> ]	( </td <td>1</td> <td>30</td>	1	30	
		<del></del>		<del></del>	30		1
Boulders ( > 2:				<del></del>			
Boulders ( > 2: Bedrock							
Boulders ( > 2: Bedrock Habitat	56 mm)	timal		Condition	Category		
Boulders ( > 2: Bedrock	56 mm)	timal	Subo	Condition ptimal	Category Mai	rginal	Poor
Boulders ( > 2: Bedrock Habitat	Op Greater than 70%	6 of substrate	<b>Subo</b> 40-70% mix of st	Condition ptimal able habitat; well-	Category Mai 20-40% mix of si	rginal table habitat;	Poor Less than 20% stable habitat; lack
Boulders ( > 25 Bedrock Habitat Parameter	Op Greater than 70% favorable for epi	6 of substrate faunal colonization	Subo 40-70% mix of st	Condition ptimal able habitat; well- onization	Category Mai 20-40% mix of st habitat availabilit	r <b>ginal</b> table habitat; ty less then	Poor Less than 20% stable habitat; lack of habitat is obvious; substrate
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal	Op Greater than 70%	6 of substrate faunal colonization iix of snags,	<b>Subo</b> 40-70% mix of st	Condition ptimal able habitat; well-onization te habitat for	Category Mai 20-40% mix of si	rginal table habitat; ty less then ate frequently	Poor Less than 20% stable habitat; lack
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate /	Greater than 70% favorable for epi and fish cover; m submerged lobs, cobble or other s	of substrate faunal colonization ix of snags, undercut banks, table habitat and	Subo 40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit	Condition ptimal able habitat; well- onization te habitat for opulations, ional substrate in	Category Mai 20-40% mix of si habitat availabilit desirable; substra	rginal table habitat; ty less then ate frequently	Poor Less than 20% stable habitat; lack of habitat is obvious; substrate
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available	Greater than 70% favorable for epi and fish cover; m submerged lobs, cobble or other s at stage to allow	of substrate faunal colonization ix of snags, undercut banks, table habitat and full colonication	Subo 40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa	Condition ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet	Category Mai 20-40% mix of si habitat availabilit desirable; substra	rginal table habitat; ty less then ate frequently	Poor Less than 20% stable habitat; lack of habitat is obvious; substrate
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate /	Greater than 70% favorable for epi and fish cover; m submerged lobs, cobble or other s at stage to allow potential (i.e., log	a of substrate faunal colonization ix of snags, undercut banks, table habitat and full colonication gs/snags that are	Subo 40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo	Condition ptimal lable habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate	Category Mai 20-40% mix of si habitat availabilit desirable; substra	rginal table habitat; ty less then ate frequently	Poor Less than 20% stable habitat; lack of habitat is obvious; substrate
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available	Greater than 70% favorable for epi and fish cover; m submerged lobs, cobble or other s at stage to allow	a of substrate faunal colonization ix of snags, undercut banks, table habitat and full colonication gs/snags that are	Subo 40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa	Condition ptimal lable habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate	Category Mai 20-40% mix of si habitat availabilit desirable; substra	rginal table habitat; ty less then ate frequently	Poor Less than 20% stable habitat; lack of habitat is obvious; substrate
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover	Greater than 70% favorable for epi and fish cover; m submerged lobs, cobble or other s at stage to allow potential (i.e., log not new fall and stage to allow potential (i.e., log not new fall	a of substrate faunal colonization ix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).	Subo 40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca	Condition ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate alle).	Category Mai 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	rginal table habitat; ty less then ate frequently boved.	Poor Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available	Greater than 70% favorable for epi and fish cover; m submerged lobs, cobble or other s at stage to allow potential (i.e., log not new fall and allow 20 19	a of substrate faunal colonization ix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).	Subo 40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca	Condition ptimal able habitat; well- onization te habitat for opulations, ional substrate in all, but not yet nization (may rate ale).	Category Mai 20-40% mix of st habitat availabilit desirable; substrat disturbed or remo	rginal table habitat; ty less then ate frequently boved.	Poor Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover	Greater than 70% favorable for epi and fish cover; m submerged lobs, cobble or other s at stage to allow potential (i.e., log not new fall and incomplete the complete factors).	a of substrate faunal colonization aix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  8 17 16 ate materials, with	Subo  40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sea	Condition ptimal able habitat; well- onization te habitat for opulations, ional substrate in all, but not yet nization (may rate alle).  3 12 11 and, mud, or clay;	Category Mai 20-40% mix of si habitat availabilit desirable; substra disturbed or remo	rginal table habitat; ty less then ate frequently oved.  8 7 6 or sand bottom;	Poor Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1 Hard-pan clay or bedrock; no root
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover	Greater than 70% favorable for epi and fish cover; m submerged lobs, cobble or other s at stage to allow potential (i.e., log not new fall and incomplete the complete factors).	of substrate faunal colonization aix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 ate materials, with and prevalent; root	Subo  40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sea	Condition ptimal lable habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 11 lnd, mud, or clay; inant; some root	Category Mai 20-40% mix of si habitat availabilit desirable; substra disturbed or remo	rginal table habitat; ty less then ate frequently boved.	Poor Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover	Greater than 70% favorable for epi and fish cover; m submerged lobs, cobble or other s at stage to allow potential (i.e., log not new fall and in the substructure of substruc	of substrate faunal colonization aix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 ate materials, with and prevalent; root	Subo  40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca  15 14  Mixture of soft sc mud may be dom	Condition ptimal lable habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 11 lnd, mud, or clay; inant; some root	Category Mai 20-40% mix of st habitat availabilit desirable; substrat disturbed or remo	rginal table habitat; ty less then ate frequently oved.  8 7 6 or sand bottom;	Poor Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1 Hard-pan clay or bedrock; no root
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE	Greater than 70% favorable for epi and fish cover; m submerged lobs, cobble or other s at stage to allow potential (i.e., lognot new fall and 20 19 Mixture of substr gravel and firm s mats and submer common.	of substrate faunal colonization aix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 ate materials, with and prevalent; root	Subo  40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca  15 14  Mixture of soft sc mud may be dom mats and submerg	Condition ptimal lable habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 11 lnd, mud, or clay; inant; some root	Category Mai 20-40% mix of st habitat availabilit desirable; substrat disturbed or remo	rginal table habitat; ty less then ate frequently oved.  8 7 6 or sand bottom;	Poor Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1 Hard-pan clay or bedrock; no root
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate	Greater than 70% favorable for epi and fish cover; m submerged lobs, cobble or other s at stage to allow potential (i.e., lognot new fall and 20 19 Mixture of substr gravel and firm s mats and submer common.	of substrate faunal colonization aix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 ate materials, with and prevalent; root	Subo  40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca  15 14  Mixture of soft sc mud may be dom mats and submerg	Condition ptimal lable habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 11 lnd, mud, or clay; inant; some root	Category Mai 20-40% mix of st habitat availabilit desirable; substrat disturbed or remo	rginal table habitat; ty less then ate frequently oved.  8 7 6 or sand bottom;	Poor Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1 Hard-pan clay or bedrock; no root
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterizat	Greater than 70% favorable for epi and fish cover; m submerged lobs, cobble or other s at stage to allow potential (i.e., lognot new fall and 20 19 Mixture of substr gravel and firm s mats and submer common.	of substrate faunal colonization aix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 ate materials, with and prevalent; root	Subo  40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca  15 14  Mixture of soft sc mud may be dom mats and submerg	Condition ptimal lable habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 11 lnd, mud, or clay; inant; some root	Category Mai 20-40% mix of st habitat availabilit desirable; substrat disturbed or remo	rginal table habitat; ty less then ate frequently oved.  8 7 6 or sand bottom;	Poor Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1 Hard-pan clay or bedrock; no root
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterizat	Greater than 709 favorable for epi and fish cover; m submerged lobs, cobble or other s at stage to allow potential (i.e., log not new fall and in the stage of th	of substrate faunal colonization aix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 ate materials, with and prevalent; root	Subo  40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sea 15 14 Mixture of soft samud may be dom mats and submera present.	Condition ptimal lable habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 11 lnd, mud, or clay; inant; some root	Category Mai 20-40% mix of st habitat availabilit desirable; substrat disturbed or remo	rginal table habitat; ty less then ate frequently oved.  8 7 6 or sand bottom;	Poor Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1 Hard-pan clay or bedrock; no root
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Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterization  SCORE  3. Pool Variability	Greater than 70% favorable for epi and fish cover; m submerged lobs, cobble or other s at stage to allow potential (i.e., lognot new fall and incomplete for epi and firm s mats and submer common.  20 19  Even mix of large deep, small-shall pools present.	a of substrate faunal colonization aix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 ate materials, with and prevalent; root ged vegetation  18 17 16shallow, large- ow, small-deep	Subo  40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca 15 14 Mixture of soft st mud may be dom mats and submera present.  15 14 Majority of pool few shallow.	Condition ptimal able habitat; well-onization te habitat for opulations, ional substrate in all, but not yet mization (may rate ale).  3 12 11 and, mud, or clay; inant; some root ged vegetation	Category  Mai  20-40% mix of si habitat availabilit desirable; substra disturbed or remo  10 9  All mud or clay of little or no root ar vegetation.  10 9  Shallow pools ma prevalent than de	rginal table habitat; ty less then atte frequently by best of the frequently by the	Poor  Less than 20% stable habitat, lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root mat or vegetation.  5 4 3 2 1  Majority of pools small-shallow or pools absent
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(LB) SCORE	Right Bank 10 9	8 7 6	5 4 3	2 1 0
	Den Dank 10 9	0 / 0	1 ,	
bank riparian zone) SCORE	Left Bank 10 9	8 7 6	5 4 3	2 1 (0)
Zone Width (score each				
10. Riparian Vegetative	human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	meters; human activites have impacted zone only minimally.	meters; human activities have impacted zone a great deal.	little or no riparian vegetation due to human activity.
(RB)	Width of riparian zone >18 meters;	Width of riparian zone 12-18	Width of riparian zone 6-12	Width of riparian zone <6 meters,
(LB) SCORE	Right Bank 10 9	8 7 6	5 (4) 3	2 1 0
SCORE	allowed to grow naturally.  Left Bank 10 9	potential plant stubble height remaining.	5 4 3	2 1 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including shrubs, or nonwoody macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented; disruption evident but not affecting full plant growth potential to any great extent; more than one half of the	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 cm or less in stubble height.
SCORE (RB)	Right Bank 10 (9)	8 7 6	5 4 3	2 1 0
SCORE (LB)	Left Bank 10 (9)	8 7 6	5 4 3	2 1 0
Note: determine left or right side by facing downstream				erosional sears.
Stability (score each bank)	little potential for future problems. <5% of bank affected.	healed over, 5-30% of bank in reach has areas of erosion.	high erosion potential during floods.	sections and bends, obvious bank sloughing, 60-100% of bank has
8. Bank	Banks stable; evidence of erosion or bank failure absent or minimal;	Moderately stable; infrequent, small areas of erosion mostly	Moderatly unstable; 30-60% of bank in reach has areas of erosion;	Unstable; many eroded areas; "raw" areas frequent along straight
Sinuosity SCORE	and other low-lying areas. This parameter is not easily rated in these areas.	15 14 13 12 11	10 9 (8) 7 6	5 4 3 2 1
7. Channel	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note-channel braiding is considered normal in coastal plains	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
SCORE	20 19 18 17 16	is not present.  15 14 13 (12) 11	10 9 8 7 6	5 4 3 2 1
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 years) may be present, but recent channelization is not present.	of stream reach channelized and	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 (14) 13 12 11	10 9 8 7 6	5 4 3 2 1
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	
SCORE	20 19 18 17 (16)	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
4. Sediment Deposition	or point bars and less than 5%	formation, mostly from gravel, sand, or fine sediment; 5-30% (20- 50% for low-gradient) of the bottom affected; slight deposition in pools.	sand or fine sediment on old and new bars; 30-50% (50-80% for low gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	increased bar development; more
	Little or no enlargement of islands or point bars and less than 5%	Some new increase in bar formation, mostly from gravel,	1 -	Heavy deposits of fine material increased bar development: mo

Stream Name:	Lower	Howard's	Creek		Location: 🗘	mu S.C	03
Station #: 3	2+25	Mile:			Basin/Watersh		
LAT.:		LONG.:			County: Cla	rk USGS 7	.5 TOPO:
Date: 7/28	OF Time:	1:00 AM	(PM)		Investigators:	LH + JJ	
		Type Sam	ple: P-Chem	Macroinver	tebrate Fish	Bacteria	
Weather:		Now	Past 24 hours		Has there been	heavy rain in la	st 7 days?
1			ө Heavy Rain		(Yes)	No	
			e Steady Rain		Air Temperatu	re <b>85</b> °F.	
			Intermittent	Showers	Inches rainfall	in past 24 hours	<b>2</b> in
			Θ Clear/Sunhy	5	20 % Cloud		
P-Che	m: Temp (°	C) D.O.	(mg/l) %	6Saturation	pH (S.U.)	Cond.	Grab
Instream Wat		Local Watersl	` ',		. p., (5,5,7,		
Features:	ersueu	Predominate S		d Hear			
	ЦÍ					I	
Stream Width:		e Surface Mini	-	Θ Construction		e Forest	
Range of Deptl		ө Deep Mining		e Commercial		e Pasture / Gra	zıng
Average Veloc		ө Oil Wells		e Industrial		Θ Silviculture	
Discharge:	cfs	ө Land Dispos	al	ө Row Crops		Urban Runof	f / Storm Sewers
Est. Reach Len	gth:	<u> </u>					
Hydraulic Stru	ctures:		Stream Flow:	•		Stream Type:	
e Dams	Bridge Abut	ments	ө Dry	e Pooled	(Low)	e Perennial	Θ Intermittent
e Island	o Waterfalls		ө Normal	ө High		Θ Ephemeral	ө Ѕеер
o Other	o materians		e Very Rapid o	~		p	
	etion:	Dom. Tree / Sh				ł	Channel Alterations:
Riparian Veget		Dom. Hee / St		Canopy Cover:			
Dominate Type	_		(	θ Fully Expose			θ Dredging
θ Trees	o Shrubs			e Partially Sha			e Channelization
θ Grasses	Herbaceous	>			osed (50-75%)		(o Full or o Partial)
Number of Stra	ata			θ Fully Shaded			
Substrate e Est	. ө Р.С.		Riffle _	<u>50</u> %	Run	<u>70</u> %	Pool <u>30</u> %
Silt / Clay (< 0	.06 mm)						
Sand (0.06 - 2	mm)		30		30		30
Gravel (2 - 64 )	mm)		50		50		50
Cobble (64 - 2:	56 mm)		20		70		20
Boulders ( > 25							
<del></del>							
пзеагоск			L		ľ		
Bedrock Habitat	1		<u> </u>	Condition	Category		
Habitat	On	timal	Suho		Category Mai	rginal	Poor
<u> </u>		timal		ptimal	Mai	rginal	Poor
Habitat	Greater than 70%	6 of substrate	40-70% mix of st	<b>ptimal</b> able habitat; well-	<b>Mai</b> 20-40% mix of st	table habitat;	Less than 20% stable habitat; lack
Habitat Parameter	Greater than 70% favorable for epi	6 of substrate faunal colonization	40-70% mix of st suited for full col-	ptimal able habitat; well- onization	Mai 20-40% mix of si habitat availabilit	table habitat; ty less then	Less than 20% stable habitat; lack of habitat is obvious; substrate
Habitat	Greater than 70% favorable for epi and fish cover; m	6 of substrate faunal colonization nix of snags,	40-70% mix of st suited for full col- potential; adequa	ptimal able habitat; well- onization te habitat for	Mai 20-40% mix of si habitat availabilit desirable; substra	table habitat; ty less then ate frequently	Less than 20% stable habitat; lack
Habitat Parameter	Greater than 70% favorable for epi	6 of substrate faunal colonization nix of snags, undercut banks,	40-70% mix of st suited for full col-	ptimal  able habitat; well- onization te habitat for opulations;	Mai 20-40% mix of si habitat availabilit	table habitat; ty less then ate frequently	Less than 20% stable habitat; lack of habitat is obvious; substrate
Habitat Parameter  1. Epifaunal	Greater than 70% favorable for epi and fish cover; in submerged lobs, cobble or other s	6 of substrate faunal colonization nix of snags, undercut banks, table habitat and	40-70% mix of st suited for full col- potential; adequa maintenance of p	ptimal able habitat; well- onization te habitat for opulations; ional substrate in	Mai 20-40% mix of si habitat availabilit desirable; substra	table habitat; ty less then ate frequently	Less than 20% stable habitat; lack of habitat is obvious; substrate
Habitat Parameter  1. Epifaunal Substrate /	Greater than 70% favorable for epi and fish cover; in submerged lobs,	6 of substrate faunal colonization nix of snags, undercut banks, table habitat and full colonication	40-70% mix of st suited for full col- potential; adequa maintenance of p presence of addit the form of newfa	ptimal able habitat; well- onization te habitat for opulations; ional substrate in	Mai 20-40% mix of si habitat availabilit desirable; substra	table habitat; ty less then ate frequently	Less than 20% stable habitat; lack of habitat is obvious; substrate
Habitat Parameter  1. Epifaunal Substrate / Available	Greater than 70% favorable for epi and fish cover; ir submerged lobs, cobble or other s at stage to allow	6 of substrate faunal colonization nix of snags, undercut banks, table habitat and full colonication gs/snags that are	40-70% mix of st suited for full col- potential; adequa maintenance of p presence of addit the form of newfa	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate	Mai 20-40% mix of si habitat availabilit desirable; substra	table habitat; ty less then ate frequently	Less than 20% stable habitat; lack of habitat is obvious; substrate
Habitat Parameter  1. Epifaunal Substrate / Available	Greater than 70% favorable for epi and fish cover; ir submerged lobs, cobble or other s at stage to allow potential (i.e., lo	6 of substrate faunal colonization nix of snags, undercut banks, table habitat and full colonication gs/snags that are	40-70% mix of st suited for full col- potential; adequa maintenance of p presence of addit the form of newfa prepared for colo	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate	Mai 20-40% mix of si habitat availabilit desirable; substra	table habitat; ty less then ate frequently	Less than 20% stable habitat; lack of habitat is obvious; substrate
Habitat Parameter  1. Epifaunal Substrate / Available	Greater than 70% favorable for epi and fish cover; in submerged lobs, cobble or other s at stage to allow potential (i.e., loj not new fall and	6 of substrate faunal colonization nix of snags, undercut banks, table habitat and full colonication gs/snags that are	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate	Mai 20-40% mix of si habitat availabilit desirable; substra	table habitat; ty less then ate frequently	Less than 20% stable habitat; lack of habitat is obvious; substrate
Habitat Parameter  1. Epifaunal Substrate / Available Cover	Greater than 70% favorable for epi and fish cover; in submerged lobs, cobble or other s at stage to allow potential (i.e., lognot new fall and	6 of substrate faunal colonization nix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate alle).	Man 20-40% mix of st habitat availabilit desirable; substra disturbed or remain 10 9	table habitat; ty less then ate frequently oved.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
Habitat Parameter  1. Epifaunal Substrate / Available Cover	Greater than 70% favorable for epi and fish cover; in submerged lobs, cobble or other s at stage to allow potential (i.e., lognot new fall and 20 19  Mixture of substi	6 of substrate faunal colonization nix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca 15 14 Mixture of soft sa	ptimal able habitat; well- onization te habitat for opulations, ional substrate in all, but not yet nization (may rate alle).  13 12 (1) and, mud, or clay;	Man 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	table habitat; ty less then ate frequently oved.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
Habitat Parameter  1. Epifaunal Substrate / Available Cover	Greater than 70% favorable for epi and fish cover; in submerged lobs, cobble or other s at stage to allow potential (i.e., lognot new fall and 20 19  Mixture of substi	6 of substrate faunal colonization nix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca 15 14 Mixture of soft sa	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate alle).  13 12 (11) and, mud, or clay; inant; some root	Man 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	table habitat; ty less then ate frequently oved.  8 7 6 or sand bottom;	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root
Habitat Parameter  1. Epifaunal Substrate / Available Cover	Greater than 70% favorable for epi and fish cover; in submerged lobs, cobble or other s at stage to allow potential (i.e., lo not new fall and 20 19  Mixture of substigravel and firm s	6 of substrate faunal colonization nix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca 15 14 Mixture of soft sa mud may be dom	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate alle).  13 12 (11) and, mud, or clay; inant; some root	Man 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	table habitat; ty less then ate frequently oved.  8 7 6 or sand bottom;	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root
Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool	Greater than 70% favorable for epi and fish cover; in submerged lobs, cobble or other s at stage to allow potential (i.e., lo not new fall and 20 19 Mixture of substigravel and firm s mats and submer common.	6 of substrate faunal colonization nix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca 15 14 Mixture of soft st mud may be dom mats and submer	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate alle).  13 12 (11) and, mud, or clay; inant; some root	Man 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	table habitat; ty less then ate frequently oved.  8 7 6 or sand bottom;	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root
Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate	Greater than 70% favorable for epi and fish cover; in submerged lobs, cobble or other s at stage to allow potential (i.e., lo not new fall and 20 19 Mixture of substigravel and firm s mats and submer common.	6 of substrate faunal colonization nix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca 15 14 Mixture of soft st mud may be dom mats and submer	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate alle).  13 12 (11) and, mud, or clay; inant; some root	Man 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	table habitat; ty less then ate frequently oved.  8 7 6 or sand bottom;	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root
Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterizat	Greater than 70% favorable for epi and fish cover; in submerged lobs, cobble or other s at stage to allow potential (i.e., lo not new fall and 20 19 Mixture of substigravel and firm s mats and submer common.	6 of substrate faunal colonization nix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca 15 14 Mixture of soft st mud may be dom mats and submer	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate alle).  13 12 (11) and, mud, or clay; inant; some root	Man 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	table habitat; ty less then ate frequently oved.  8 7 6 or sand bottom;	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root
Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterizat ion	Greater than 70% favorable for epi and fish cover; in submerged lobs, cobble or other s at stage to allow potential (i.e., lognot new fall and 20 19  Mixture of substigravel and firm s mats and submer common.	6 of substrate faunal colonization nix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root ged vegetation	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca 15 14 Mixture of soft samud may be dom mats and submer present.	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate alle).  13 12 (1) and, mud, or clay; inant; some root ged vegetation	Man  20-40% mix of st habitat availabilit desirable; substrat disturbed or remo  10 9  All mud or clay of little or no root m vegetation.	table habitat; ty less then ate frequently oved.  8 7 6 or sand bottom; nat; no submerged	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root
Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterizat	Greater than 70% favorable for epi and fish cover; in submerged lobs, cobble or other s at stage to allow potential (i.e., loj not new fall and 20 19 Mixture of substigravel and firm s mats and submer common.	6 of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root ged vegetation	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca 15 14 Mixture of soft sa mud may be dom mats and submer present.	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 (1) and, mud, or clay; inant; some root ged vegetation	Man  20-40% mix of st habitat availabilit desirable; substrat disturbed or remo  10 9  All mud or clay of little or no root in vegetation.	table habitat; ty less then ate frequently oved.  8 7 6 or sand bottom; nat; no submerged	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root mat or vegetation.
Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterizat ion  SCORE	Greater than 70% favorable for epi and fish cover; in submerged lobs, cobble or other s at stage to allow potential (i.e., loj not new fall and 20 19 Mixture of substigravel and firm s mats and submer common.	6 of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root ged vegetation  18 17 16 e-shallow, large-	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca 15 14 Mixture of soft sa mud may be dom mats and submer present.	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 (1) and, mud, or clay; inant; some root ged vegetation	Man  20-40% mix of st habitat availabilit desirable; substrat disturbed or remo  10 9  All mud or clay of little or no root m vegetation.	table habitat; ty less then ate frequently oved.  8 7 6 or sand bottom; nat; no submerged	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root mat or vegetation.
Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterization  SCORE  3. Pool	Greater than 70% favorable for epi and fish cover; in submerged lobs, cobble or other s at stage to allow potential (i.e., lognot new fall and 20 19  Mixture of substigravel and firm s mats and submer common.  20 19  Even mix of larg deep, small-shall	6 of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root ged vegetation  18 17 16 e-shallow, large-	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca 15 14 Mixture of soft sa mud may be dom mats and submer present.	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 (1) and, mud, or clay; inant; some root ged vegetation	Man  20-40% mix of st habitat availabilit desirable; substrat disturbed or remo  10 9  All mud or clay of little or no root in vegetation.	table habitat; ty less then ate frequently oved.  8 7 6 or sand bottom; nat; no submerged	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root mat or vegetation.
Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterizat ion  SCORE	Greater than 70% favorable for epi and fish cover; in submerged lobs, cobble or other s at stage to allow potential (i.e., loj not new fall and 20 19 Mixture of substigravel and firm s mats and submer common.	6 of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root ged vegetation  18 17 16 e-shallow, large-	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca 15 14 Mixture of soft sa mud may be dom mats and submer present.	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 (1) and, mud, or clay; inant; some root ged vegetation	Man  20-40% mix of st habitat availabilit desirable; substrat disturbed or remo  10 9  All mud or clay of little or no root m vegetation.	table habitat; ty less then ate frequently oved.  8 7 6 or sand bottom; nat; no submerged	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root mat or vegetation.
Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterization  SCORE  3. Pool	Greater than 70% favorable for epi and fish cover; in submerged lobs, cobble or other s at stage to allow potential (i.e., lognot new fall and 20 19  Mixture of substigravel and firm s mats and submer common.  20 19  Even mix of larg deep, small-shall	6 of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root ged vegetation  18 17 16 e-shallow, large-	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca 15 14 Mixture of soft sa mud may be dom mats and submer present.	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 (1) and, mud, or clay; inant; some root ged vegetation	Man  20-40% mix of st habitat availabilit desirable; substrat disturbed or remo  10 9  All mud or clay of little or no root m vegetation.	table habitat; ty less then ate frequently oved.  8 7 6 or sand bottom; nat; no submerged	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root mat or vegetation.
Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterizat ion  SCORE  3. Pool	Greater than 70% favorable for epi and fish cover; in submerged lobs, cobble or other s at stage to allow potential (i.e., loj not new fall and 20 19  Mixture of substigravel and firm s mats and submer common.  20 19  Even mix of larg deep, small-shall pools present.	6 of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root ged vegetation  18 17 16 e-shallow, large-	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca 15 14 Mixture of soft st mud may be dom mats and submer present.  15 14 Majority of pool few shallow.	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 (1) and, mud, or clay; inant; some root ged vegetation	Man  20-40% mix of st habitat availabilit desirable; substrat disturbed or remo  10 9  All mud or clay of little or no root m vegetation.	table habitat; ty less then ate frequently oved.  8 7 6 or sand bottom; nat; no submerged	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root mat or vegetation.
Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterizat ion  SCORE  3. Pool Variability	Greater than 70% favorable for epi and fish cover; in submerged lobs, cobble or other s at stage to allow potential (i.e., lo not new fall and 20 19  Mixture of substigravel and firm s mats and submer common.  20 19  Even mix of larg deep, small-shall pools present.	6 of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are not transient).  18 17 16  rate materials, with and prevalent; root ged vegetation  18 17 16  e-shallow, large- ow, small-deep	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca 15 14 Mixture of soft st mud may be dom mats and submer present.  15 14 Majority of pool few shallow.	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate alle).  13 12 (11) and, mud, or clay; inant; some root ged vegetation  13 12 11 large-deep; very	Man  20-40% mix of st habitat availabilit desirable; substrat disturbed or remo  10 9  All mud or clay of little or no root in vegetation.  10 9  Shallow pools in prevalent than de	table habitat; ty less then ate frequently oved.  8 7 6 or sand bottom; nat; no submerged  8 7 6 uch more sep pools.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root mat or vegetation.  5 4 3 2 1  Majority of pools small-shallow or pools absent
Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterizat ion  SCORE  3. Pool Variability	Greater than 70% favorable for epi and fish cover; in submerged lobs, cobble or other s at stage to allow potential (i.e., lo not new fall and 20 19  Mixture of substigravel and firm s mats and submer common.  20 19  Even mix of larg deep, small-shall pools present.	6 of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are not transient).  18 17 16  rate materials, with and prevalent; root ged vegetation  18 17 16  e-shallow, large- ow, small-deep	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca 15 14 Mixture of soft st mud may be dom mats and submer present.  15 14 Majority of pool few shallow.	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 (1) and, mud, or clay; inant; some root ged vegetation	Man  20-40% mix of st habitat availabilit desirable; substrat disturbed or remo  10 9  All mud or clay of little or no root in vegetation.  10 9  Shallow pools in prevalent than de	table habitat; ty less then ate frequently oved.  8 7 6 or sand bottom; nat; no submerged  8 7 6 uch more sep pools.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root mat or vegetation.  5 4 3 2 1  Majority of pools small-shallow or pools absent
Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterizat ion  SCORE  3. Pool Variability	Greater than 70% favorable for epi and fish cover; in submerged lobs, cobble or other s at stage to allow potential (i.e., lo not new fall and 20 19  Mixture of substigravel and firm s mats and submer common.  20 19  Even mix of larg deep, small-shall pools present.	6 of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are not transient).  18 17 16  rate materials, with and prevalent; root ged vegetation  18 17 16  e-shallow, large- ow, small-deep	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca 15 14 Mixture of soft st mud may be dom mats and submer present.  15 14 Majority of pool few shallow.	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 (1) and, mud, or clay; inant; some root ged vegetation	Man  20-40% mix of st habitat availabilit desirable; substrat disturbed or remo  10 9  All mud or clay of little or no root in vegetation.  10 9  Shallow pools in prevalent than de	table habitat; ty less then ate frequently oved.  8 7 6 or sand bottom; nat; no submerged  8 7 6 uch more sep pools.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root mat or vegetation.  5 4 3 2 1  Majority of pools small-shallow or pools absent
Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterizat ion  SCORE  3. Pool Variability  SCORE	Greater than 70% favorable for epi and fish cover; in submerged lobs, cobble or other s at stage to allow potential (i.e., lo not new fall and 20 19  Mixture of substigravel and firm s mats and submer common.  20 19  Even mix of larg deep, small-shall pools present.	6 of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are not transient).  18 17 16  rate materials, with and prevalent; root ged vegetation  18 17 16  e-shallow, large- ow, small-deep	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca 15 14 Mixture of soft st mud may be dom mats and submer present.  15 14 Majority of pool few shallow.	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 (1) and, mud, or clay; inant; some root ged vegetation	Man  20-40% mix of st habitat availabilit desirable; substrat disturbed or remo  10 9  All mud or clay of little or no root in vegetation.  10 9  Shallow pools in prevalent than de	table habitat; ty less then ate frequently oved.  8 7 6 or sand bottom; nat; no submerged  8 7 6 uch more sep pools.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root mat or vegetation.  5 4 3 2 1  Majority of pools small-shallow or pools absent
Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterizat ion  SCORE  3. Pool Variability  SCORE	Greater than 70% favorable for epi and fish cover; in submerged lobs, cobble or other s at stage to allow potential (i.e., lo not new fall and 20 19  Mixture of substigravel and firm s mats and submer common.  20 19  Even mix of larg deep, small-shall pools present.	6 of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are not transient).  18 17 16  rate materials, with and prevalent; root ged vegetation  18 17 16  e-shallow, large- ow, small-deep	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca 15 14 Mixture of soft st mud may be dom mats and submer present.  15 14 Majority of pool few shallow.	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 (1) and, mud, or clay; inant; some root ged vegetation	Man  20-40% mix of st habitat availabilit desirable; substrat disturbed or remo  10 9  All mud or clay of little or no root in vegetation.  10 9  Shallow pools in prevalent than de	table habitat; ty less then ate frequently oved.  8 7 6 or sand bottom; nat; no submerged  8 7 6 uch more sep pools.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan elay or bedrock; no root mat or vegetation.  5 4 3 2 1  Majority of pools small-shallow or pools absent

4. Sediment  4. Sediment  4. Sediment  5. Channel  Deposition  A. Sediment  5. Channel  5. Channel  5. Channel  6. Channel  Alteration  5. Channel  7. Channel  The bends in the stream increase the stream increase the stream hough 3 to 4 tons.  The bends in the stream increase the stream hough 3 to 4 tons.  The bends in the stream increase the stream hough 3 to 4 tons.  The bends in the stream increase the stream hough 3 to 4 tons.  The bends in the stream hough 3 to 4 tons.  The bends in the stream hough 3 to 4 tons.  The bends in the stream hough 3 to 4 tons.  The bends in the stream hough 3 to 4 tons.  The bends in the stream hough 3 to 4 tons.  The bends in the stream hough 3 to 4 tons.  The bends in the stream hough 3 to 4 tons.  The bends in the stream hough 3 to 4 tons.  The bends in the stream hough 3 to 4 tons.  The bends in the stream hough 3 to 4 tons.  The bends in the stream hough 4 to 4 tons.  The bends in the stream hough 4 to 4 tons.  The bends in the stream hough 4 to 4 tons.  The bends in the stream hough 4 to 4 tons.  The bends in the stream hough 5 to 4 tons.  The bends in the stream hough 6 to 1 tons.  The bends in the stream hough 6 to 1 tons.  The bends in the stream hough 6 tons.  The bends in the stream bough 6 tons.  The bends in the stream bough 6 tons.  The			· · · · · · · · · · · · · · · · · · ·		
4. Scriment Deposition  1. Colored Study sedemants of the bottom affected by sedemant of the bottom affected slight deposition in pask.  2. Description of the study of the study of the sedemant of the bottom affected slight deposition in pask.  3. Channel Noter creation for of folial lowers back, and minimal amount of clamed substrate is exposed.  3. Channel substrate is exposed.  3. Channel substrate is exposed.  3. Channel substrate is exposed.  4. Channel substrate is exposed.  4. Channel substrate is exposed.  5. Channel substrate is exposed.  5. Channel substrate is exposed.  5. Channel substrate is exposed.  6. Channel substrate is exposed.  7. Channel substrate is exposed.  7. Channel substrate is exposed.  7. Channel substrate is exposed.  8. Service substrate is exposed.  8. Service substrate is exposed.  8. Service substrate is exposed.  9. Service substrate is exposed.  9. Service substrate is exposed.  8. Service substrate is exposed.  9. Vegetative substrate is exposed.  1. Service substrate is exposed.  2. Service substrate is exposed.  1. Service substrate is exposed.  2. Service substrate is exposed.  2. Service substrate is exp		Little or no enlargement of islands	Some new increase in bar	Moderate deposition of new gravel,	Heavy deposits of fine material,
4. Sectional deposition.  Second:    30   19   18   17   16   15   14   13   17   11   10   9   8   7   0   5   4   3   2   1		or point bars and less than 5%	formation, mostly from gravel,	sand or fine sediment on old and	increased bar development; more
Deposition    Second   20   19   18   17   16   15   14   13   12   11   10   9   8   7   6   5   4   3   2   1		(<20% for low-gradient streams) of	sand, or fine sediment; 5-30% (20-	new bars; 30-50% (50-80% for low	than 50% (80% for low-gradient)
Deposition   Sposition   Spo	4. Sediment	the bottom affected by sediment	50% for low-gradient) of the	gradient) of the bottom affected;	of the bottom changing frequently
SCORE 20 19 18 17 10		deposition.	bottom affected; slight deposition	sediment deposits at obstructions,	pools almost absent due to
Water resches base of both lower status  S. Channel Flow Status  S. Channel S. S. Channel S. Channe	Deposition	·	in pools.	•	f*
SCORE  20 19 18 17 16			'		
Water reaches base of both lower banks, and maintain amount of chamnel banks, and maintain amount of chamnel substrate is exposed.  Channel banks, and maintain amount of chamnel substrate is exposed.  Channel banks, and maintain amount of chamnel substrate is exposed.  Channel banks, and maintain amount of chamnel substrate is exposed.  Channel banks, and of self-self-self-self-self-self-self-self-				l poeta provincia.	
Water reaches base of both lower banks, and maintain amount of chamnel banks, and maintain amount of chamnel substrate is exposed.  Channel banks, and maintain amount of chamnel substrate is exposed.  Channel banks, and maintain amount of chamnel substrate is exposed.  Channel banks, and maintain amount of chamnel substrate is exposed.  Channel banks, and of self-self-self-self-self-self-self-self-					
SCORE  2 0 19 18 17 16  Channel channel control or dredging absert patron.  SCORE  2 10 18 17 16  The bends in the stream increase longer than fit was in a straight or these areas.  SCORE  2 10 18 17 16  The bends in the stream increase longer than fit was in a straight or these areas.  SCORE  2 10 18 17 16  The bends in the stream increase longer than fit was in a straight or these areas.  SCORE  2 10 18 17 16  The bends in the stream increase longer than fit was in a straight or these areas.  SCORE  2 10 18 17 16  The bends in the stream increase longer than fit was in a straight or these areas.  SCORE  2 10 18 17 16  The bends in the stream increase longer than fit was in a straight or the stream increase longer than fit was in a straight or the stream length 10 2 increase longer than fit was in a straight or the stream increase longer than fit was in a straight or the stream length 10 2 increase longer than fit was in a straight or the stream in	SCORE	20 19 18 17 16	15 14 13 12 11	10/9876	5 4 3 2 1
SCORE  2 0 19 18 17 16  Channel channel control or dredging absert patron.  SCORE  2 10 18 17 16  The bends in the stream increase longer than fit was in a straight or these areas.  SCORE  2 10 18 17 16  The bends in the stream increase longer than fit was in a straight or these areas.  SCORE  2 10 18 17 16  The bends in the stream increase longer than fit was in a straight or these areas.  SCORE  2 10 18 17 16  The bends in the stream increase longer than fit was in a straight or these areas.  SCORE  2 10 18 17 16  The bends in the stream increase longer than fit was in a straight or these areas.  SCORE  2 10 18 17 16  The bends in the stream increase longer than fit was in a straight or the stream increase longer than fit was in a straight or the stream length 10 2 increase longer than fit was in a straight or the stream increase longer than fit was in a straight or the stream length 10 2 increase longer than fit was in a straight or the stream in					
SCORE 2 10 18 17 16 Situation for the section of th		Water reaches base of both lower	Water fills >75% of the available	Water fills 25-75% of the available	Very little water in channel and
Score 20 19 18 17 16 Some chamelastine is exposed.  Channel pattern with normal pattern.  Channel patt	5. Channel	banks, and minimal amount of	channel; or <25% of channel	1	
Channel part   Chan	Flow Status	channel substrate is exposed	substrate is exposed	1	, , , , , , , , , , , , , , , , , , ,
Channel Alteration   Channel		J			
Channel Alteration   Channel					
channel Alteration  Alteration  SCORE 20 19 18 17 16 5 3 4 13 12 11 10 9 8 7 6 5 4 3 2 1 10 12 11 10 9 8 7 6 5 4 3 2 1 10 12 11 10 9 8 7 6 5 4 3 2 1 10 12 11 10 9 8 7 6 5 5 4 3 2 1 10 12 11 10 9 8 7 6 5 5 4 3 2 1 10 12 11 10 9 8 7 6 5 5 4 3 2 1 10 12 11 10 9 8 7 6 5 5 4 3 2 1 10 12 11 10 9 8 7 6 5 5 4 3 2 1 10 12 11 10 9 8 7 6 5 5 4 3 2 1 10 12 11 10 9 8 7 6 5 5 4 3 2 1 10 12 11 10 9 8 7 6 5 5 4 3 2 1 10 12 11 10 9 8 7 6 5 5 4 3 2 1 10 12 11 10 9 8 7 6 5 5 4 3 2 1 10 12 11 10 9 8 7 6 5 5 4 3 2 1 10 12 11 10 9 8 7 6 5 5 4 3 2 1 10 12 11 10 9 8 7 6 5 5 4 3 2 1 10 12 11 10 9 8 7 6 5 5 4 3 2 1 10 12 11 10 10 9 8 7 6 5 5 4 3 3 10 12 11 10 10 10 12 11 11 10 10 10 12 11 11 10 10 10 12 11 11 10 10 10 12 11 11 10 10 10 12 11 11 10 10 10 12 11 11 10 10 10 12 11 11 10 10 10 12 11 11 10 10 10 12 11 11 10 10 10 12 11 11 10 10 10 12 11 11 10 10 10 12 11 11 10 10 10 12 11 11 10 10 10 12 11 11	SCORE	20 19 18 17 16	15 14 (13) 12 11	10 9 8 7 6	5 4 3 2 1
or minimal, stream with normal pattern.  Stream Alteration  SCORE 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 1 5 4 3 2 1 1 10 10 10 10 10 10 10 10 10 10 10 10		Channelization or dredging absent	Some channelization present,	Channelization may be extensive;	Banks shored with gabion or
abutternation pattern.    SCORE   20   9   18   17   6   15   34   (1)   12   11   10   9   8   7   6   5   4   3   2   1   10   10   10   10   10   10			usually in areas of bridge		~
Alteration  Alteration  Grade that past 20 years may be greened, but recent channelization is not present.  The bends in the stream increase the stream length 3 to 4 times longer than fit was in a straight line.  The bends in the stream increase the stream length 3 to 4 times longer than fit was in a straight line.  The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.  The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.  The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.  The bends in the stream increase length in 0 2 times longer than if it was in a straight line.  The bends in the stream increase length in 0 2 times longer than if it was in a straight line.  The bends in the stream increase length in 0 2 times longer than if it was in a straight line.  The bends in the stream increase length in 0 2 times longer than if it was in a straight line.  The bends in the stream increase length in 0 2 times longer than if it was in a straight line.  The bends in the stream increase length in 0 2 times longer than if it was in a straight line.  The bends in the stream increase length in 0 2 times longer than if it was in a straight line.  The bends in the stream increase length in 0 2 times longer than if it was in a straight line.  The bends in the stream increase length in 0 2 times longer than if it was in a straight line.  The bends in the stream increase length in 0 2 times longer than if it was in a straight line.  The bends in the stream increase length in 0 2 times longer than if it was in a straight line.  The bends in the stream length in 0 2 times longer than if it was in a straight line.  The bends in the stream increase length in 0 2 times longer than in was in a straight line.  The bends in the stream length in 0 2 times longer than in the stream increase length in 0 2 times longer than in the stream length in 0 2 times longer than in the stream	6 Channal	1			The state of the s
greater than past 20 years) may be dissuppted.    present but recent channelization is not present. but recent channelization is not present.			; ·	l'	'
present, but recent channelization is appresent.  SCORE 20 19 18 17 16 15 14 (13) 12 11 10 9 8 7 6 5 4 3 7 1  The bends in the stream negrate the stream length in 2 times longer than if it was in a straight line.  The bends in the stream negrate the stream length in 2 times longer than if it was in a straight line.  The bends in the stream length in 2 times longer than if it was in a straight line.  Sinusity  The bends in the stream length in 2 times longer than if it was in a straight line.  Sinusity and other low-long areas. This parameter is not easily rated in these areas.  SCORE 20 19 18 17 16	Alteration				
SCORE   20   19   18   17   16   15   14   13   12   11   10   9   8   7   6   5   4   3   2   1    The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note-channel braiding is black stream length 3 to 4 times longer than if it was in a straight line. (Note-channel braiding is larger than 1 the was in a straight line. (Note-channel braiding is larger than 1 the was in a straight line. (Note-channel braiding is larger than 1 the was in a straight line. (Note-channel braiding is larger than 1 the was in a straight line. (Note-channel braiding is larger than 1 the was in a straight line. (Note-channel braiding than 1 the was in a straight line. (Note-channel braiding than 1 the was in a straight line. (Note-channel braiding than 1 the was in a straight line. (Note-channel braiding than 1 the was in a straight line. (Note-channel braiding than 1 the was in a straight line. (Note-channel braiding than 1 the was in a straight line. (Note-channel braiding than 1 the was in a straight line. (Note-channel braiding than 1 the was in a straight line. (Note-channel braiding than 1 the was in a straight line. (Note-channel braiding than 1 the was in a straight line. (Note-channel braiding than 1 the was in a straight line. (Note-channel braiding than 1 the was in a straight line. (Note-channel braiding than 1 the was in a straight line. (Note channel braiding than 1 the was in a straight line. (Note channel braiding than 1 the was in a straight line. (Note channel braiding than 1 the was in a straight line. (Note than 1 the was in a straight line. (Note than 1 the was in a straight line. (Note than 1 the was in a straight line. (Note than 1 the was in a straight line. (Note than 1 the was in a straight line. (Note than 1 the was in a straight line. (Note than 1 the was in a straight line. (Note than 1 the was in a straight line. (Note than 1 the was in a straight line. (Note than 1 the was in a straight line. (Note than 1 the was in a straight line. (Note than 1 the was				atsrupted.	removed charery.
The hends in the stream increase to see increase the stream increase to see increase the stream increase to see increase the stream increase to see increase the stream increase to see increase the stream increase the stream increase			f*		
The bends in the stream increase the stream length 3 to 4 times the stream length 1 to 2 times and other low-lying areas. This parameter is not ensily rated in these areas.  SCORE 20 19 18 17 16  8. Bank Stability (score each bank)  Note. determine the or in the stream increase the stream length 1 to 2 times	ocour	20 10 10 15		10 0 -	, , , , , , , , , , , , , , , , , , , ,
the stream length 1 to 2 times longer than if it was in a straight line. (Note channel braiding is considered normal in coastal plains and other love-lying areas. This parameter is not easily rated in these access.  SCORE 2 19 18 17 16  8. Bank Stability of bank in teach bank stability of bank in teach has areas of erosion.  Stability of bank affected.  Moderately stable, inflequent, or bank failure absent or minimal, stability of bank in teach has areas of erosion.  Moderately stable, inflequent, or bank failure absent or minimal, stability of bank in teach has areas of erosion.  Moderately stable, inflequent, or bank failure absent or minimal, stability of bank in teach has areas of erosion.  Moderately stable, inflequent, or bank failure absent or minimal, stability of bank in teach has areas of erosion.  Moderately stable, inflequent, or bank in teach has areas of erosion.  Moderately stable, inflequent, or bank failure absent or minimal, stability of bank in teach has areas of erosion.  Moderately stable, inflequent, or bank in teach has areas of erosion.  Moderately stable, inflequent, bank in teach has areas of erosion.  Moderately stable, inflequent, bank in teach has areas of erosion.  Moderately stable, inflequent, bank in teach has areas of erosion.  Moderately stable, inflequent, bank in teach has areas of erosion.  Moderately stable, inflequent, bank in teach has areas of erosion.  Moderately stable, inflequent, bank in teach has areas of erosion.  Moderately stable, inflequent, bank in teach has areas of erosion.  Moderately stable, inflequent, bank in teach has areas of erosion.  Moderately stable, inflequent, bank in teach has areas of erosion.  Moderately stable, inflequent, bank in teach has areas of erosion.  Moderately stable, inflequent, bank in teach has areas of erosion.  Moderately stable, inflequent, bank in teach has areas of erosion.  Moderately stable, inflequent, bank in teach has areas of erosion.  Moderately stable, inflequent, bank in teach has areas of erosion.  Moderately stabl	SCORE				
Channel   Conger than if it was in a straight line   Conger than the was in a straight line   Conger than the was in a straight line   Conger than if it			1	The bends in the stream increase	Channel straight; waterway has
Sinusity		the stream length 3 to 4 times	1 -	the stream length 1 to 2 times	been channelized for a long
Sinusity		longer than if it was in a straight	longer than if it was in a straight	longer than if it was in a straight	distance.
SCORE    Bank   Stability (score each bank in consist and the forw-lying areas). This parameter is not easily rated in these areas.		line. (Note-channel braiding is	line.	line.	
SCORE   2 a 19   18   17   16   (15)   14   13   12   11   10   9   8   7   6   5   4   3   2   1   1   10   9   8   7   6   5   4   3   2   1   1   10   9   8   7   6   5   4   3   2   1   1   10   9   8   7   6   5   4   3   2   1   1   1   10   9   8   7   6   5   4   3   2   1   1   1   10   9   8   7   6   5   4   3   2   1   1   1   1   10   9   8   7   6   5   4   3   2   1   1   1   1   1   1   1   1   1		considered normal in coastal plains			
Banks stable, evidence of erosion or bank failure absent or minimal; stability (score each bank)   Score each bank   Score each bank)   Score each bank)   Score each bank   Score each bank)   Score each bank   Score each bank)   Score each bank   Score each bank)   Score each bank   Score	Sinuosity	and other low-lying areas. This			
SCORE		· "			
Bank stable, evidence of crosion or bank failure absent or minimal, interpotential for future problems, consisting to reach bank)  Note: determine left or right side by facing downstream  SCORE Right Bank 10 9 8 7 6 5 4 3 2 1 0 Unistable, many croded areas, bring floods.  Note determine left or right side by facing downstream  SCORE Right Bank 10 9 8 7 6 5 4 3 2 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		1'			
Bank   Stability					
Bank   Stability				<u></u>	
Stability (score each bank)  Note: determine (filter proteins)  SCORE   Left Bank   10   9   8   7   6   5   4   3   2   1   0    Note determine (IAB)  SCORE   Right Bank   10   9   8   7   6   5   4   3   2   1   0    Note determine (IAB)  SCORE   Right Bank   10   9   8   7   6   5   4   3   3   2   1   0    Note determine (IAB)  SCORE   Left Bank   10   9   8   7   6   5   4   3   3   2   1   0    Note that the proteins and immediate riparian zone covered by native vegetation, including shrubs, or notwoody macrophytes; vegeative disruption through grazing or mowing minimal allowed to grow naturally.  SCORE   Left Bank   10   9   8   7   6   5   4   3   2   1   0    Note that the proteins of the streambank surfaces covered by native vegetation, including shrubs, or notwood, macrophytes; vegeative disruption or not evident, almost all plants allowed to grow naturally.  SCORE   Left Bank   10   9   8   7   6   5   4   3   2   1   0    SCORE   Right Bank   10   9   8   7   6   5   4   3   2   1   0    Note that provide the streambank surfaces covered by native vegetation, including shrubs, or notwood, macrophytes; vegeative disruption or not evident, almost all plants allowed to grow naturally.  SCORE   Left Bank   10   9   8   7   6   5   4   3   2   1   0    Note that provide the streambank surfaces covered by vegetation, only great point potential plant stubble height remaining.  SCORE   Left Bank   10   9   8   7   6   5   4   3   2   1   0    Note that provide the streambank surfaces covered by vegetation, only great point potential plant stubble height remaining.  SCORE   Left Bank   10   9   8   7   6   5   4   3   2   1   0    Note that provide the streambank surfaces covered by vegetation, only great potential plant stubble height remaining.  Note that provide the streambank surfaces covered by remaining the streambank surfaces covered by vegetation, only great potential plant stubble height remaining.  Note that provide the streambank surfaces covered by the streambank surfaces covered by remaining to	SCORE	20 19 18 17 16	(15) 14 13 12 11	10 9 8 7 6	5 4 3 2 1
stability (score each bank affected.)  Note determine left or right side by facing downstream  SCORE   Left Bank   10   9   8   7   6   5   4   3   2   1   0    Note than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including shrubs, or notwoody macrophytes; vegeative disruption through grazing or mowing minimal or not evident, almost all plant sallowed to grow naturally.  SCORE   Left Bank   10   9   8   7   6   5   4   3   2   1   0    Note than 90% of the streambank surfaces covered by native vegetation, including shrubs, or notwoody macrophytes; vegeative disruption or not evident, almost all plants allowed to grow naturally.  SCORE   Left Bank   10   9   8   7   6   5   4   3   2   1   0    Note than 90% of the streambank surfaces covered by native vegetation, including shrubs, or notwoody macrophytes; vegeative disruption of rot evident, almost all plants allowed to grow naturally.  SCORE   Left Bank   10   9   8   7   6   5   4   3   2   1   0    Note than 90% of the streambank surfaces covered by native vegetation, including shrubs, or notwoody macrophytes; vegeative disruption of rot evident, almost all plants allowed to grow naturally.  SCORE   Left Bank   10   9   8   7   6   5   4   3   2   1   0    Width of riparian zone   18 meters, human activities have impacted zone only minimally.  10. Riparian Vegetation of ropping and plant stubble done only minimally.  10. Riparian Vegetation of the potential plant stubble hank riparian zone   12   10   10    Width of riparian zone   18 meters, human activities have impacted zone only minimally.  10. Riparian Vegetative Zone Width (score each bank riparian zone   18 meters, human activities have impacted zone only minimally.  11. Riparian Vegetation of the potential plant stubble height remaining the plant st	Q Donk	Banks stable, evidence of erosion	Moderately stable; infrequent,	Moderatly unstable; 30-60% of	Unstable; many eroded areas;
Score each bank   Solution   S		or bank failure absent or minimal;	small areas of erosion mostly	bank in reach has areas of erosion;	"raw" areas frequent along straight
Second   S		little potential for future problems.	healed over. 5-30% of bank in	high erosion potential during	sections and bends; obvious bank
Note, determine fell or right side by facing downstream  SCORE (LB)  Right Bank 10 9 8 7 6 5 4 3 2 1 0  RB  More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident, almost all plants allowed to grow naturally.  SCORE   Left Bank 10 9 8 7 6 5 4 3 2 1 0  Width of riparian zone >18 meters, human activities fice, parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.  Width of riparian zone >18 meters, human activities have impacted zone only minimally.  SCORE   Left Bank 10 9 8 7 6 5 4 3 2 1 0  Width of riparian zone >18 meters, human activities have impacted zone only minimally.  Width of riparian zone >18 meters, human activities have impacted zone only minimally.  SCORE   Left Bank 10 9 8 7 6 5 4 3 2 1 0  Width of riparian zone >18 meters, human activities have impacted zone a great deal.  Width of riparian zone <10 meters, human activities have impacted zone a great deal.  SCORE   Left Bank 10 9 8 7 6 5 4 3 2 1 0  Width of riparian zone >18 meters, human activities have impacted zone a great deal.  Width of riparian zone >18 meters, human activities have impacted zone a great deal.  SCORE   Left Bank 10 9 8 7 6 5 4 3 2 1 0  Width of riparian zone >18 meters, human activities have impacted zone a great deal.  SCORE   Left Bank 10 9 8 7 6 5 4 3 2 1 0  Width of riparian zone <12 meters, human activities have impacted zone a great deal.  SCORE   Left Bank 10 9 8 7 6 5 4 3 2 1 0  Width of riparian zone >18 meters, human activities have impacted zone a great deal.	(score each	, ,	•		
Note: determine left or right side by facing downstream  SCORE   Left Bank   10   9   8   7   6   5   4   3   2   1   0    SCORE   Right Bank   10   9   8   7   6   5   4   3   2   1   0    More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including shrubs, or nonwood macrophytes; vegeative disruption widen but not affecting full plant strobble height remaining.  SCORE   Left Bank   10   9   8   7   6   5   4   3   2   1   0    More than 90% of the streambank surfaces covered by native vegetation; including shrubs, or nonwood macrophytes; vegeative disruption widen but not affecting full plant strobble height remaining.  SCORE   Left Bank   10   9   8   7   6   5   4   3   2   1   0    SCORE   Right Bank   10   9   8   7   6   5   4   3   2   1   0    Midth of riparian zone > 18 meters; human activities have impacted zone only minimally.  Width of riparian zone > 18 meters; human activities have impacted zone a great deal.  Width of riparian zone < 8 meters; human activities have impacted zone a great deal.  Negetative  Zone Width (score each bank riparian zone)  Right Bank   10   9   8   7   6   5   4   3   2   1   0    Width of riparian zone > 10   2   1   0    Right Bank   10   9   8   7   6   5   4   3   2   1   0    Width of riparian zone > 10   2   1   0    Right Bank   10   9   8   7   6   5   4   3   2   1   0    Width of riparian zone > 10   2   1   0    Right Bank   10   9   8   7   6   5   4   3   2   1   0    Right Bank   10   9   8   7   6   5   4   3   2   1   0    Right Bank   10   9   8   7   6   5   4   3   2   1   0    Right Bank   10   9   8   7   6   5   4   3   2   1   0    Right Bank   10   9   8   7   6   5   4   3   2   1   0    Right Bank   10   9   8   7   6   5   4   3   2   1   0    Right Bank   10   9   8   7   6   5   4   3   2   1   0    Right Bank   10   9   8   7   6   5   4   3   2   1   0    Right Bank   10   9   8   7   6   5   4   3   2   1   0    Right Bank   10   9   8   7   6   5   4   3   2   1   0    Right Bank   10   9	bank)				
left or right side by facing downstream SCORE (LB) SCORE   Left Bank   10   9   8   7   6   5   4   3   2   1   0      Right Bank   10   9   8   7   6   5   4   3   2   1   0      More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including strubs, or nonwoody macrophytes; vegeative through grazing or mowing minimal or not evident, almost all plants allowed to grow naturally.    SCORE   Left Bank   10   9   8   7   6   5   4   3   2   1   0      More than 90% of the streambank surfaces covered by native vegetation, including strubs, or nonwoody macrophytes; vegeative distinguish and including strubs, or nonwood with the potential plant stubble height remaining.    SCORE   Right Bank   10   9   8   7   6   5   4   3   2   1   0   0   0   0   0   0   0   0   0	Maria data milia	1			
by facing downstream SCORE (LB)					
SCORE   Left Bank   10   9   8   7   6   5   4   3   2   1   0    SCORE   Right Bank   10   9   8   7   6   5   4   3   2   1   0    More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including shrubs, or nonwoody macrophytes: vegetative streambank surfaces and immediate riparian zone covered by native vegetation, but one class of plants is not well represented, disruption obvious; patches of bare soil or closely cropped vegetation; disruption obvious; patches of bare soil or closely cropped vegetation including shrubs, or nonwoody macrophytes: vegetative strength but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height remaining.  SCORE   Left Bank   10   9   8   7   6   5   4   3   2   1   0    Width of riparian zone > 18 meters, human activities have impacted zone only minimally.  Width of riparian zone < 18 meters, human activities have impacted zone a great deal.  Width of riparian zone < 6 meters impacted zone a great deal.  Width of riparian zone < 6 meters, human activities have impacted zone only minimally.  SCORE   Left Bank   10   9   8   7   6   5   4   3   2   1   0    Width of riparian zone < 6 meters, human activities have impacted zone only minimally.  The potential plant stubble and the potential plant stubble and the potential plant stubble and the potential plant stubble height remaining.  Width of riparian zone < 18 meters, human activities have impacted zone a great deal.  Width of riparian zone < 6 meters impacted zone a great deal.  Width of riparian zone < 6 meters impacted zone a great deal.  Width of riparian zone < 6 meters impacted zone a great deal.  Width of riparian zone < 1 meters, human activities have impacted zone and great deal.  Width of riparian zone < 1 meters, human activities have impacted zone and great deal.  Width of riparian zone < 1 meters, human activities have impacted zone only minimally.  Width of riparian zone < 1 meters, human activities have impa					
Left Bank   10   9   8   7   6   5   4   3   2   1   0				İ	
CLB    SCORE   Right Bank   10   9   8   7   6   5   4   3   2   1   0	downstream				
REGORE (RB)    Right Bank   10   9   8   7   6   5   4   3   2   1   0	SCORE	Left Bank 10 (9)	8 7 6	5 4 3	2 1 0
Solution	(LB)				
More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation; under growth potential plant subble height remaining.  SCORE   Left Bank   10   9   8   7   6   5   4   3   2   1   0    Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.  Width (score each bank riparian zone)  SCORE   Left Bank   10   9   8   7   6   5   4   3   2   1   0    Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.  Width (score each bank riparian zone)  ROORE   Right Bank   10   9   8   7   6   5   4   3   2   1   0    Width (score each bank riparian zone)  ROORE   Right Bank   10   9   8   7   6   5   4   3   2   1   0    Width of riparian zone >18 meters; human activities have impacted zone only minimally.  Width of riparian zone >6   2   1   0    Width of riparian zone >6   2   2   1   0    Width of riparian zone >6   2   2   0    Width of riparian zone >6   2   3   2   0    Width of riparian zone >6   2   3   2   0    Width of riparian zone >6   2   3   2   0    Width of riparian zone >	SCORE	Right Bank 10 (9)	8 7 6	5 4 3	2 1 0
surfaces and immediate riparian zone covered by native vegetation, including shrubs, or nonwoody macrophytes; vegeative disruption (score each bank)  SCORE   Left Bank   10   9   8   7   6   5   4   3   2   1   0    Width of riparian zone >18 meters; human activities (i.e., parking lots, roabeds, clear-cuts, lawns, or crops) have not impacted zone.  Width (score each bank riparian zone)  SCORE   Left Bank   10   9   8   7   6   5   4   3   2   1   0    Width of riparian zone >18 meters; human activities have impacted zone only minimally.  SCORE   Left Bank   10   9   8   7   6   5   4   3   2   1   0    Width of riparian zone >18 meters; human activities have impacted zone only minimally.  SCORE   Left Bank   10   9   8   7   6   5   4   3   2   1   0    Width of riparian zone >18 meters; human activities have impacted zone only minimally.  SCORE   Left Bank   10   9   8   7   6   5   4   3   2   1   0    Width of riparian zone >18 meters; human activities have impacted zone only minimally.  SCORE   Left Bank   10   9   8   7   6   5   4   3   2   1   0    Width of riparian zone >18 meters; human activities have impacted zone a great deal.  Width of riparian zone >6 meters; human activities have impacted zone a great deal.  SCORE   Left Bank   10   9   8   7   6   5   4   3   2   1   0    Width of riparian zone >10   10   10   10   10   10   10   10	(RB)				
surfaces and immediate riparian zone covered by native vegetation, including shrubs, or nonwoody macrophytes; vegeative disruption (score each bank)  SCORE   Left Bank   10   9   8   7   6   5   4   3   2   1   0    Width of riparian zone >18 meters; human activities (i.e., parking lots, roabeds, clear-cuts, lawns, or crops) have not impacted zone.  Width (score each bank riparian zone)  SCORE   Left Bank   10   9   8   7   6   5   4   3   2   1   0    Width of riparian zone >18 meters; human activities have impacted zone only minimally.  SCORE   Left Bank   10   9   8   7   6   5   4   3   2   1   0    Width of riparian zone >18 meters; human activities have impacted zone only minimally.  SCORE   Left Bank   10   9   8   7   6   5   4   3   2   1   0    Width of riparian zone >18 meters; human activities have impacted zone only minimally.  SCORE   Left Bank   10   9   8   7   6   5   4   3   2   1   0    Width of riparian zone >18 meters; human activities have impacted zone only minimally.  SCORE   Left Bank   10   9   8   7   6   5   4   3   2   1   0    Width of riparian zone >18 meters; human activities have impacted zone a great deal.  Width of riparian zone >6 meters; human activities have impacted zone a great deal.  SCORE   Left Bank   10   9   8   7   6   5   4   3   2   1   0    Width of riparian zone >10   10   10   10   10   10   10   10		More than 90% of the streambank	70-90% of the streambank	50-70% of the streambank	Less than 50% of the streambank
zone covered by native vegetation, including shrubs, or nonwoody macrophytes; vegetative disruption (score each bank)  SCORE (I.B)  Right Bank 10 9  Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.  Width (score each bank riparian zone)  Right Bank 10 9  Width (score each bank riparian zone)  Right Bank 10 9  Width (score each bank riparian zone)  Right Bank 10 9  Width (score each bank riparian zone)  Right Bank 10 9  Right Bank 10 9  Width (score each bank riparian zone)  Right Bank 10 9					
Including shrubs, or nonwoody macrophytes; vegeative disruption (score each bank)   Including shrubs, or nonwoody macrophytes; vegeative disruption (score each bank)   Including shrubs, or nonwoody macrophytes; vegeative disruption (score each bank)   Including shrubs, or nonwoody macrophytes; vegeative disruption (score each bank)   Including shrubs, or nonwoody macrophytes; vegeative disruption (score each bank)   Including shrubs, or nonwoody macrophytes; vegeative disruption (score each bank riparian zone)   Including shrubs, or nonwoody macrophytes; vegeative disruption (evident but not affecting full plant through grazing or mowing minimal growth potential to any great or not evident, almost all plants all owed to grow naturally.   Including shrubs, or nonwoody macrophytes; vegeative disruption (evident but not affecting full plant through grazing or mowing minimal growth potential to any great or not evident but not affecting full plant through grazing or mowing minimal growth potential to any great or not evident but not affecting full plant through grazing full plant through grazing or mowing minimal growth potential to any great or not evident but not affecting full plant through grazing full plant through grazing or mowing minimal growth potential to any great extent; more than one half of the potential plant stubble height remaining.      SCORE					
macrophytes; vegeative disruption through grazing or mowing minimal or not evident, almost all plants allowed to grow naturally.   evident but not affecting full plant through grazing or mowing minimal or not evident, almost all plants allowed to grow naturally.   SCORE   Left Bank   10   9   8   7   6   5   4   3   2   1   0				1	·
through grazing or mowing minimal or not evident, almost all plants allowed to grow naturally.  SCORE (LB) SCORE (RB)  Width of riparian zone >18 meters, human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.  Wight Bank Vegetative Zone Width (score each bank riparian zone) SCORE (LB) SCORE (LB)  Right Bank  Width of sparian zone only minimally.  Width of sparian zone on impacted zone only minimally.  Width of sparian zone on impacted zone only minimally.  Width of sparian zone on impacted zone only minimally.  Width of sparian zone on impacted zone only minimally.  Width of sparian zone on impacted zone only minimally.  Width of sparian zone on impacted zone only minimally.  Width of sparian zone on impacted zone only minimally.  Width of sparian zone on impacted zone only minimally.  Width of sparian zone on impacted zone only minimally.  Width of sparian zone on impacted zone on impacted zone only minimally.  Width of sparian zone on impacted zone on impacted zone only minimally.  Width of sparian zone on impacted zone on i	Protection	, .		, ,, ,	
bank) or not evident; almost all plants allowed to grow naturally.  SCORE   Left Bank   10   9   8   7   6   5   4   3   2   1   0    (RB)   Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.  10. Riparian   Zone Width (score each bank riparian zone)   Left Bank   10   9   8   7   6   5   4   3   2   1   0    Width of riparian zone > 18 meters; human activities have impacted zone a great deal.  Width of riparian zone < 6 meters; human activities have impacted zone a great deal.  Width of riparian zone < 6 meters; human activities have impacted zone a great deal.  SCORE   Left Bank   10   9   8   7   6   5   4   3   2   1   0    SCORE   Right Bank   10   9   8   7   6   5   4   3   2   1   0    Right Bank   10   9   8   7   6   5   4   3   2   1   0    Right Bank   10   9   8   7   6   5   4   3   2   1   0	(score each			1	
allowed to grow naturally.    Potential plant stubble height remaining		, , , ,	, , , , , , ,	1	in saudite neight.
remaining  SCORE (Left Bank 10 9 8 7 6 5 4 3 2 1 0  SCORE (RB)  Width of riparian zone >18 meters, human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.  10. Riparian Vegetative Zone Width (score each bank riparian zone)  SCORE Left Bank 10 9 8 7 6 5 4 3 2 1 0  Width of riparian zone 6-12 meters; human activities have impacted zone only minimally.  In the second control of the second contro	,	•		Tomaning.	
SCORE (LB)  Right Bank 10 9		anowed to grow naturally.		1	
CLB    SCORE   Right Bank   10   9   8   7   6   5   4   3   2   1   0					
SCORE (RB)    Right Bank   10   9   (8   7   6   5   4   3   2   1   0		Left Bank 10 9	8/ 7 6	5 4 3	2 1 0
Width of riparian zone >18 meters; human activities have impacted zone only minimally.   Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.   Width of riparian zone <6 meters; human activities have impacted zone a great deal.   Width of riparian zone <6 meters; human activities have impacted zone a great deal.   Width of riparian zone <6 meters; human activities have impacted zone a great deal.   Width of riparian zone <6 meters; human activities have impacted zone a great deal.   Width of riparian zone <6 meters; human activities have impacted zone a great deal.   Width of riparian zone <6 meters; human activities have impacted zone a great deal.   Width of riparian zone <6 meters; human activities have impacted zone a great deal.   Width of riparian zone <6 meters; human activities have impacted zone a great deal.   Width of riparian zone <6 meters; human activities have impacted zone a great deal.   Width of riparian zone <6 meters; human activities have impacted zone a great deal.   Width of riparian zone <6 meters; human activities have impacted zone a great deal.   Width of riparian zone <6 meters; human activities have impacted zone a great deal.   Width of riparian zone <6 meters; human activities have impacted zone a great deal.   Width of riparian zone <6 meters; human activities have impacted zone a great deal.   Width of riparian zone <6 meters; human activities have impacted zone a great deal.   Width of riparian zone <6 meters; human activities have impacted zone a great deal.   Width of riparian zone <6 meters; human activities have impacted zone a great deal.   Width of riparian zone <6 meters; human activities have impacted zone a great deal.   Width of riparian zone <6 meters; human activities have impacted zone a great deal.   Width of riparian zone <6 meters; human activities have impacted zone a great deal.   Width of riparian zone <6 meters; human activities have impacted zone a great deal.   Width of riparian zone <6 meters; human activities have impac			<u> </u>		
Width of riparian zone >18 meters; human activities have impacted zone only minimally.  10. Riparian Vegetative Zone Width (score each bank riparian zone)  SCORE Left Bank 10 9 8 7 6 5 4 3 2 1 0 SCORE (LB)  Right Bank 10 9 8 7 6 5 4 3 2 1 0 SCORE (LB)  Right Bank 10 9 8 7 6 5 4 3 2 1 0 SCORE (LB)	SCORE	Right Bank 10 9	/(8) 7 6	5 4 3	2 1 0
human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.  10. Riparian Vegetative Zone Width (score each bank riparian zone)  SCORE Left Bank 10 9 8 7 6 5 4 3 2 1 0 (LB)  SCORE Right Bank 10 9 8 7 6 5 4 3 2 1 0 (Date of the content	Los es		I	1	
human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.  10. Riparian Vegetative Zone Width (score each bank riparian zone)  SCORE Left Bank 10 9 8 7 6 5 4 3 2 1 0 (LB)  SCORE Right Bank 10 9 8 7 6 5 4 3 2 1 0 (Date of the content	(RB)	<u> </u>		* · · · · · · · · · · · · · · · · · · ·	
roadbeds, clear-cuts, lawns, or crops) have not impacted zone.  Ito human activity.  In the principal response impacted zone only minimally.  Impacted zone a great deal.  Ito human activity.	(KB)	Width of riparian zone >18 meters.	Width of riparian zone 12-18	Width of riparian zone 6-12	Width of riparian zone <6 meters;
10. Riparian Crops) have not impacted zone.  Vegetative Zone Width (score each bank riparian zone)  SCORE Left Bank 10 9 8 7 6 5 4 3 2 1 0 (LB)  SCORE Right Bank 10 9 8 7 6 5 4 3 2 1 (0)	(KB)		1 '	1	i .
Vegetative Zone Width (score each bank riparian zone)  SCORE	(KB)	human activities (i.e., parking lots,	meters; human activites have	meters; human activities have	little or no riparian vegetation due
Zone Width (score each bank riparian zone)  SCORE Left Bank 10 9 8 7 6 5 4 3 2 1 0 (LB)  SCORE Right Bank 10 9 8 7 6 5 4 3 2 1 (0)		human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or	meters; human activites have	meters; human activities have	little or no riparian vegetation due
(score each bank riparian zone)           SCORE         Left Bank         10         9         8         7         6         5         4         3         2         1         0           CLB)         SCORE         Right Bank         10         9         8         7         6         5         4         3         2         1         0	10. Riparian	human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or	meters; human activites have	meters; human activities have	little or no riparian vegetation due
(score each bank riparian zone)           SCORE         Left Bank         10         9         8         7         6         5         4         3         2         1         0           CLB)         SCORE         Right Bank         10         9         8         7         6         5         4         3         2         1         0		human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or	meters; human activites have	meters; human activities have	little or no riparian vegetation due
bank riparian           zone)         SCORE         Left Bank         10         9         8         7         6         5         4         3         2         1         0           CLB)         SCORE         Right Bank         10         9         8         7         6         5         4         3         2         1         0	10. Riparian	human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or	meters; human activites have	meters; human activities have	little or no riparian vegetation due
ZORE         Left Bank         10         9         8         7         6         5         4         3         2         1         0           (LB)         SCORE         Right Bank         10         9         8         7         6         5         4         3         2         1         0	10. Riparian Vegetative Zone Width	human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or	meters; human activites have	meters; human activities have	little or no riparian vegetation due
SCORE (LB)         Left Bank 10 9         8 7 6         5 4 3         2 1 0           SCORE         Right Bank 10 9         8 7 6         5 4 3         2 1 0	10. Riparian Vegetative Zone Width (score each	human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	meters; human activites have	meters; human activities have	little or no riparian vegetation due
(LB)  SCORE Right Bank 10 9 8 7 6 5 4 3 2 1 (0)	10. Riparian Vegetative Zone Width (score each bank riparian	human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	meters; human activites have	meters; human activities have	little or no riparian vegetation due
SCORE Right Bank 10 9 8 7 6 5 4 3 2 1 (0)	10. Riparian Vegetative Zone Width (score each bank riparian zone)	human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	meters; human activites have impacted zone only minimally.	meters; human activities have impacted zone a great deal.	little or no riparian vegetation due to human activity.
	10. Riparian Vegetative Zone Width (score each bank riparian zone) SCORE	human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	meters; human activites have impacted zone only minimally.	meters; human activities have impacted zone a great deal.	little or no riparian vegetation due to human activity.
(RB)	10. Riparian Vegetative Zone Width (score each bank riparian zone) SCORE	human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.  Left Bank 10 9	meters; human activites have impacted zone only minimally.	meters; human activities have impacted zone a great deal.	little or no riparian vegetation due to human activity.
	10. Riparian Vegetative Zone Width (score each bank riparian zone) SCORE (LB) SCORE	human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.  Left Bank 10 9	meters; human activites have impacted zone only minimally.	meters; human activities have impacted zone a great deal.	little or no riparian vegetation due to human activity.

Stream Name:		trib-	of Lower	Howards Cr.	Location: W		.5. C 03
	3+50	Mile:			Basin/Watersh	ed: LHC	
LAT.:		LONG.:			County: Clar	-k USGS 7	7.5 TOPO:
Date: 7/25	8 /08 Time:	1: 30 AM	(PM)		Investigators:	LH + JJ	-
7/2	0 100	Type Sam		Macroinvert		Bacteria	
Weather:	<del></del>	Now	Past 24 hours	Widefolliver		heavy rain in la	vet 7 days 9
weather:		Now		,		,	ist / days:
ł			θ Heavy Rain	(	Yes	No	
			θ Steady Rain		Air Temperatu		_
		ξ.	6 Intermittent S	Showers	Inches rainfall	in past 24 hours	s <u>-2</u> in
1		(	e Clear/Sunny	>	20 % Cloud	Cover.	
P-Che	em: Temp (°	C) D.O.	(mg/l) %	6Saturation	pH (S.U.)_	Cond.	Grab
Instream Wate		Local Watersl					
	ei sneu			d I lan			
Features:	11	Predominate Su					
Stream Width:	7	<ul><li>Θ Surface Mini</li></ul>	•	e Construction		o Forest	
Range of Depth	h: <u>8'''</u>	ө Deep Mining	,	ө Commercial		ө Pasture / Gra	zing
Average Veloci	ity: _ <b>O</b> _ft/s	ө Oil Wells		e Industrial		e Silviculture	
Discharge:	cfs	ө Land Disposa	al	ө Row Crops		<b>Y</b> Urban Runof	f / Storm Sewers
Est. Reach Len		1		•		ľ`	
		<u> </u>	Ctroom Flour	<u> </u>		Stroom Tyma:	
Hydraulic Stru			Stream Flow:		,	Stream Type:	r a san a
e Dams	θ Bridge Abut	ments	ө Dry	(Pooled)	θ Low (	θ Perennial	θ Intermittent
	e Waterfalls		e Normal	ө High		e Ephemeral	ө Ѕеер
Other 48	culvert		e Very Rapid α	or Torrential			
Riparian Veget	ation:	Dom. Tree / Sh	rub Taxa	Canopy Cover:			Channel Alterations:
Dominate Type		201111 11001 011	(	e Fully Expose	d (0-25%)		θ Dredging
E .			`				
e Trees	o Shrubs			e Partially Shad		Ģ	6 Channelization
o Grasses	ө Herbaceous			e Partially Exp			(e Full or e Partial)
Number of Stra	ata			<ul><li>θ Fully Shaded</li></ul>	(75-100%)		
Substrate e Est	. ө Р.С.		Riffle	%	Run	<u></u> %	Pool 100 %
Silt / Clay (< 0	.06 mm)						100
Sand (0.06 - 2							
Gravel (2 - 64)							
<del></del>							
Cobble (64 - 2:	<del></del>						
Boulders ( > 25	<del></del>						
	<del></del>						
Boulders ( > 25	<del></del>			Condition	Category		
Boulders ( > 25 Bedrock	56 mm)	timal	Subo	Condition ptimal		ginal	Poor
Boulders ( > 25 Bedrock Habitat	56 mm)			ptimal	Mar		Poor Less than 20% stable habitat; lack
Boulders ( > 25 Bedrock Habitat	Op Greater than 70%	6 of substrate	40-70% mix of st	ptimal table habitat; well-	<b>Mar</b> 20-40% mix of st	able habitat;	
Boulders ( > 25 Bedrock Habitat Parameter	Op Greater than 70% favorable for epi	% of substrate faunal colonization	40-70% mix of st suited for full col	ptimal table habitat; well- onization	Mar	able habitat; y less then	Less than 20% stable habitat; lack
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal	Op Greater than 70% favorable for epi and fish cover; n	6 of substrate faunal colonization nix of snags,	40-70% mix of st	ptimal table habitat; well- conization te habitat for	Mar 20-40% mix of st habitat availabilit	able habitat; y less then ite frequently	Less than 20% stable habitat; lack of habitat is obvious; substrate
Boulders ( > 25 Bedrock Habitat Parameter	Op Greater than 70% favorable for epi	6 of substrate faunal colonization nix of snags, undercut banks,	40-70% mix of st suited for full col potential; adequa	ptimal table habitat; well- conization the habitat for copulations;	Mar 20-40% mix of st habitat availabilit desirable; substra	able habitat; y less then ite frequently	Less than 20% stable habitat; lack of habitat is obvious; substrate
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal	Greater than 70% favorable for epi and fish cover; m submerged lobs, cobble or other s	6 of substrate faunal colonization nix of snags, undercut banks, stable habitat and	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit	ptimal table habitat; well- conization the habitat for copulations; tional substrate in	Mar 20-40% mix of st habitat availabilit desirable; substra	able habitat; y less then ite frequently	Less than 20% stable habitat; lack of habitat is obvious; substrate
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate /	Greater than 70% favorable for epi and fish cover; m submerged lobs,	6 of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa	ptimal table habitat; well- conization the habitat for copulations; cional substrate in all, but not yet	Mar 20-40% mix of st habitat availabilit desirable; substra	able habitat; y less then ite frequently	Less than 20% stable habitat; lack of habitat is obvious; substrate
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available	Greater than 70% favorable for epi and fish cover; m submerged lobs, cobble or other s at stage to allow	6 of substrate faunal colonization nix of snags, undercut banks, table habitat and full colonication gs/snags that are	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa	ptimal table habitat; well- onization te habitat for opulations; tional substrate in all, but not yet onization (may rate	Mar 20-40% mix of st habitat availabilit desirable; substra	able habitat; y less then ite frequently	Less than 20% stable habitat; lack of habitat is obvious; substrate
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available	Greater than 709 favorable for epi and fish cover; m submerged lobs, cobble or other s at stage to allow potential (i.e., lo	6 of substrate faunal colonization nix of snags, undercut banks, table habitat and full colonication gs/snags that are	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo	ptimal table habitat; well- onization te habitat for opulations; tional substrate in all, but not yet onization (may rate	Mar 20-40% mix of st habitat availabilit desirable; substra	able habitat; y less then ite frequently	Less than 20% stable habitat; lack of habitat is obvious; substrate
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover	Greater than 70% favorable for epi and fish cover; n submerged lobs, cobble or other s at stage to allow potential (i.e., loj not new fall and	6 of substrate faunal colonization nix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca	ptimal table habitat; well- tonization te habitat for topulations; tional substrate in all, but not yet tonization (may rate ale).	Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	able habitat; y less then tte frequently oved.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available	Greater than 709 favorable for epi and fish cover; n submerged lobs, cobble or other s at stage to allow potential (i.e., loj not new fall and	6 of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are not transient).	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of news prepared for colo at high end of sca	ptimal table habitat; well- tonization the habitat for topulations; tional substrate in all, but not yet smization (may rate ale).	Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	able habitat; y less then tte frequently oved.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover	Greater than 709 favorable for epi and fish cover; n submerged lobs, cobble or other s at stage to allow potential (i.e., loj not new fall and 20 19	6 of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with	40-70% mix of st suited for full col potential; adequa inaintenance of p presence of addit the form of newfa prepared for colo at high end of sea	ptimal table habitat; well- onization the habitat for opulations; tional substrate in all, but not yet onization (may rate ale).  13 12 11 and, mud, or clay;	Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	able habitat; y less then the frequently oved.  8 7 6 or sand bottom;	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover	Greater than 70% favorable for epi and fish cover; n submerged lobs, cobble or other s at stage to allow potential (i.e., loj not new fall and 20 19  Mixture of substigravel and firm s	6 of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca 15 14 Mixture of soft sr mud may be dom	ptimal table habitat; well- tonization the habitat for copulations; tional substrate in all, but not yet smization (may rate ale).  13 12 11 and, mud, or clay, timant; some root	Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	able habitat; y less then tte frequently oved.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool	Greater than 709 favorable for epi and fish cover; m submerged lobs, cobble or other s at stage to allow potential (i.e., lognot new fall and 20 19  Mixture of substigravel and firm s mats and submer	6 of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca 15 14 Mixture of soft st mud may be dom mats and submer	ptimal table habitat; well- tonization the habitat for copulations; tional substrate in all, but not yet smization (may rate ale).  13 12 11 and, mud, or clay, timant; some root	Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	able habitat; y less then the frequently oved.  8 7 6 or sand bottom;	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate	Greater than 709 favorable for epi and fish cover; m submerged lobs, cobble or other s at stage to allow potential (i.e., loj not new fall and 20 19 Mixture of substigravel and firm s mats and submer common.	6 of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca 15 14 Mixture of soft sr mud may be dom	ptimal table habitat; well- tonization the habitat for copulations; tional substrate in all, but not yet smization (may rate ale).  13 12 11 and, mud, or clay, timant; some root	Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	able habitat; y less then the frequently oved.  8 7 6 or sand bottom;	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterizat	Greater than 709 favorable for epi and fish cover; m submerged lobs, cobble or other s at stage to allow potential (i.e., loj not new fall and 20 19 Mixture of substigravel and firm s mats and submer common.	6 of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca 15 14 Mixture of soft st mud may be dom mats and submer	ptimal table habitat; well- tonization the habitat for copulations; tional substrate in all, but not yet smization (may rate ale).  13 12 11 and, mud, or clay, timant; some root	Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	able habitat; y less then the frequently oved.  8 7 6 or sand bottom;	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate	Greater than 709 favorable for epi and fish cover; m submerged lobs, cobble or other s at stage to allow potential (i.e., loj not new fall and 20 19 Mixture of substigravel and firm s mats and submer common.	6 of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca 15 14 Mixture of soft st mud may be dom mats and submer	ptimal table habitat; well- tonization the habitat for copulations; tional substrate in all, but not yet smization (may rate ale).  13 12 11 and, mud, or clay, timant; some root	Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	able habitat; y less then the frequently oved.  8 7 6 or sand bottom;	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterizat	Greater than 709 favorable for epi and fish cover; m submerged lobs, cobble or other s at stage to allow potential (i.e., loj not new fall and 20 19 Mixture of substigravel and firm s mats and submer common.	6 of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca 15 14 Mixture of soft st mud may be dom mats and submer	ptimal table habitat; well- tonization the habitat for copulations; tional substrate in all, but not yet smization (may rate ale).  13 12 11 and, mud, or clay, timant; some root	Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	able habitat; y less then the frequently oved.  8 7 6 or sand bottom;	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterizat ion	Greater than 709 favorable for epi and fish cover; n submerged lobs, cobble or other s at stage to allow potential (i.e., lo not new fall and 20 19  Mixture of substigravel and firm s mats and submer common.	6 of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root rged vegetation	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfaprepared for colo at high end of sea 15 14 Mixture of soft si mud may be dom mats and submer present.	ptimal table habitat; well- onization the habitat for opulations; tional substrate in all, but not yet onization (may rate ale).  13 12 11 and, mud, or clay; mant; some root ged vegetation	Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	able habitat; y less then the frequently oved.  8 7 6 or sand bottom;	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterizat	Greater than 709 favorable for epi and fish cover; n submerged lobs, cobble or other s at stage to allow potential (i.e., lognot new fall and 20 19  Mixture of subst gravel and firm s mats and submer common.	6 of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are not transient).  18 17 16  rate materials, with sand prevalent; root rged vegetation	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfaprepared for colo at high end of sca mud may be dom mats and submer present.	ptimal table habitat; well- tonization the habitat for topulations; tional substrate in all, but not yet tonization (may rate ale).  13 12 11 and, mud, or clay; tinnant; some root ged vegetation	Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo  10 9 All mud or clay of little or no root in vegetation.	able habitat; y less then the frequently oved.  8 7 6 or sand bottom; hat; no submerged	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root mat or vegetation.
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  2. Pool Substrate Characterizat ion  SCORE	Greater than 709 favorable for epi and fish cover; n submerged lobe, cobble or other s at stage to allow potential (i.e., lognot new fall and 20 19  Mixture of substigravel and firm s mats and submer common.	6 of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root rged vegetation  18 17 16 ge-shallow, large-	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfaprepared for colo at high end of sca 15 14 Mixture of soft si mud may be dom mats and submer present.	ptimal table habitat; well- tonization the habitat for topulations; tional substrate in all, but not yet tonization (may rate ale).  13 12 11 and, mud, or clay; tinnant; some root ged vegetation	Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo  10 9  All mud or clay of little or no root in vegetation.	able habitat; y less then the frequently oved.  8 7 6 or sand bottom; hat; no submerged	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root mat or vegetation.
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  2. Pool Substrate Characterization  SCORE  3. Pool	Greater than 70% favorable for epi and fish cover; in submerged lobs, cobble or other s at stage to allow potential (i.e., lognot new fall and 20 19  Mixture of substigravel and firm s mats and submer common.	6 of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root rged vegetation  18 17 16 ge-shallow, large-	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfaprepared for colo at high end of sca mud may be dom mats and submer present.	ptimal table habitat; well- tonization the habitat for topulations; tional substrate in all, but not yet tonization (may rate ale).  13 12 11 and, mud, or clay; tinnant; some root ged vegetation	Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo  10 9 All mud or clay of little or no root in vegetation.	able habitat; y less then the frequently oved.  8 7 6 or sand bottom; hat; no submerged	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root mat or vegetation.
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  2. Pool Substrate Characterizat ion  SCORE	Greater than 709 favorable for epi and fish cover; n submerged lobe, cobble or other s at stage to allow potential (i.e., lognot new fall and 20 19  Mixture of substigravel and firm s mats and submer common.	6 of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root rged vegetation  18 17 16 ge-shallow, large-	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfaprepared for colo at high end of sca 15 14 Mixture of soft si mud may be dom mats and submer present.	ptimal table habitat; well- tonization the habitat for topulations; tional substrate in all, but not yet tonization (may rate ale).  13 12 11 and, mud, or clay; tinnant; some root ged vegetation	Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo  10 9  All mud or clay of little or no root in vegetation.	able habitat; y less then the frequently oved.  8 7 6 or sand bottom; hat; no submerged	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root mat or vegetation.
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  2. Pool Substrate Characterization  SCORE  3. Pool	Greater than 70% favorable for epi and fish cover; in submerged lobs, cobble or other s at stage to allow potential (i.e., lognot new fall and 20 19  Mixture of substigravel and firm s mats and submer common.	6 of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root rged vegetation  18 17 16 ge-shallow, large-	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfaprepared for colo at high end of sca 15 14 Mixture of soft si mud may be dom mats and submer present.	ptimal table habitat; well- tonization the habitat for topulations; tional substrate in all, but not yet tonization (may rate ale).  13 12 11 and, mud, or clay; tinnant; some root ged vegetation	Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo  10 9  All mud or clay of little or no root in vegetation.	able habitat; y less then the frequently oved.  8 7 6 or sand bottom; hat; no submerged	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root mat or vegetation.
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterization  SCORE  3. Pool Variability	Greater than 709 favorable for epi and fish cover; m submerged lobs, cobble or other s at stage to allow potential (i.e., lognot new fall and 20 19 Mixture of substigravel and firm s mats and submer common.  20 19 Even mix of larg deep, small-shall pools present.	6 of substrate faunal colonization nix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16  rate materials, with sand prevalent; root rged vegetation  18 17 16  re-shallow, large-low, small-deep	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca 15 14 Mixture of soft si mud may be dom mats and submer present.  15 14 Majority of pool few shallow.	ptimal table habitat; well- tonization the habitat for topulations; tional substrate in all, but not yet tonization (may rate ale).  13 12 11 and, mud, or clay; tinnant; some root ged vegetation	Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo  10 9  All mud or clay of little or no root in vegetation.	able habitat; y less then the frequently oved.  8 7 6 or sand bottom; hat; no submerged	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root mat or vegetation.
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterization  SCORE  3. Pool Variability  SCORE	Greater than 709 favorable for epi and fish cover; m submerged lobs, cobble or other s at stage to allow potential (i.e., loj not new fall and 20 19 Mixture of substigravel and firm s mats and submer common.  20 19 Even mix of larg deep, small-shall pools present.	6 of substrate faunal colonization nix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16  rate materials, with sand prevalent; root rged vegetation  18 17 16  re-shallow, large-low, small-deep	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca 15 14 Mixture of soft si mud may be dom mats and submer present.  15 14 Majority of pool few shallow.	ptimal table habitat; well- tonization te habitat for topulations; tional substrate in all, but not yet tonization (may rate ale).  13 12 11 and, mud, or clay; tinant; some root ged vegetation  13 12 11 large-deep; very	Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo  10 9 All mud or clay o little or no root in vegetation.  10 9 Shallow pools me prevalent than de	able habitat; y less then the frequently oved.  8 7 6  or sand bottom; that; no submerged  8 7 6  uch more the pools.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root mat or vegetation.  5 4 3 2 1  Majority of pools small-shallow or pools absent
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterization  SCORE  3. Pool Variability	Greater than 709 favorable for epi and fish cover; m submerged lobs, cobble or other s at stage to allow potential (i.e., loj not new fall and 20 19 Mixture of substigravel and firm s mats and submer common.  20 19 Even mix of larg deep, small-shall pools present.	6 of substrate faunal colonization nix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16  rate materials, with sand prevalent; root rged vegetation  18 17 16  re-shallow, large-low, small-deep	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca 15 14 Mixture of soft si mud may be dom mats and submer present.  15 14 Majority of pool few shallow.	ptimal table habitat; well- tonization te habitat for topulations; tional substrate in all, but not yet tonization (may rate ale).  13 12 11 and, mud, or clay; tinant; some root ged vegetation  13 12 11 large-deep; very	Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo  10 9 All mud or clay o little or no root in vegetation.  10 9 Shallow pools me prevalent than de	able habitat; y less then the frequently oved.  8 7 6  or sand bottom; that; no submerged  8 7 6  uch more the pools.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root mat or vegetation.  5 4 3 2 1  Majority of pools small-shallow or pools absent
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterization  SCORE  3. Pool Variability  SCORE	Greater than 709 favorable for epi and fish cover; m submerged lobs, cobble or other s at stage to allow potential (i.e., loj not new fall and 20 19 Mixture of substigravel and firm s mats and submer common.  20 19 Even mix of larg deep, small-shall pools present.	6 of substrate faunal colonization nix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16  rate materials, with sand prevalent; root rged vegetation  18 17 16  re-shallow, large-low, small-deep	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca 15 14 Mixture of soft si mud may be dom mats and submer present.  15 14 Majority of pool few shallow.	ptimal table habitat; well- tonization te habitat for topulations; tional substrate in all, but not yet tonization (may rate ale).  13 12 11 and, mud, or clay; tinant; some root ged vegetation  13 12 11 large-deep; very	Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo  10 9 All mud or clay o little or no root in vegetation.  10 9 Shallow pools me prevalent than de	able habitat; y less then the frequently oved.  8 7 6  or sand bottom; that; no submerged  8 7 6  uch more the pools.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root mat or vegetation.  5 4 3 2 1  Majority of pools small-shallow or pools absent
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterization  SCORE  3. Pool Variability  SCORE	Greater than 709 favorable for epi and fish cover; m submerged lobs, cobble or other s at stage to allow potential (i.e., loj not new fall and 20 19 Mixture of substigravel and firm s mats and submer common.  20 19 Even mix of larg deep, small-shall pools present.	6 of substrate faunal colonization nix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16  rate materials, with sand prevalent; root rged vegetation  18 17 16  re-shallow, large-low, small-deep	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca 15 14 Mixture of soft si mud may be dom mats and submer present.  15 14 Majority of pool few shallow.	ptimal table habitat; well- tonization te habitat for topulations; tional substrate in all, but not yet tonization (may rate ale).  13 12 11 and, mud, or clay; tinant; some root ged vegetation  13 12 11 large-deep; very	Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo  10 9 All mud or clay o little or no root in vegetation.  10 9 Shallow pools me prevalent than de	able habitat; y less then the frequently oved.  8 7 6  or sand bottom; that; no submerged  8 7 6  uch more the pools.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root mat or vegetation.  5 4 3 2 1  Majority of pools small-shallow or pools absent
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Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterization  SCORE  3. Pool Variability  SCORE	Greater than 709 favorable for epi and fish cover; m submerged lobs, cobble or other s at stage to allow potential (i.e., loj not new fall and 20 19 Mixture of substigravel and firm s mats and submer common.  20 19 Even mix of larg deep, small-shall pools present.	6 of substrate faunal colonization nix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16  rate materials, with sand prevalent; root rged vegetation  18 17 16  re-shallow, large-low, small-deep	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca 15 14 Mixture of soft si mud may be dom mats and submer present.  15 14 Majority of pool few shallow.	ptimal table habitat; well- tonization te habitat for topulations; tional substrate in all, but not yet tonization (may rate ale).  13 12 11 and, mud, or clay; tinant; some root ged vegetation  13 12 11 large-deep; very	Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo  10 9 All mud or clay o little or no root in vegetation.  10 9 Shallow pools me prevalent than de	able habitat; y less then the frequently oved.  8 7 6  or sand bottom; that; no submerged  8 7 6  uch more the pools.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root mat or vegetation.  5 4 3 2 1  Majority of pools small-shallow or pools absent

Deposition   Depos					
S. Chunnel Status  CORE  Channel with a season of classics, and minimal amount of classics, an	4. Sediment Deposition	or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment	formation, mostly from gravel, sand, or fine sediment; 5-30% (20- 50% for low-gradient) of the bottom affected; slight deposition	sand or fine sediment on old and new bars; 30-50% (50-80% for low gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate	increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently pools almost absent due to
channel books, and minimal amount of channels absorbants is exposed abstrates is exposed abstrates is exposed.  COORT  COUNTION  COUNTIO	SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 (2) 1
Channel  Cha	5. Channel Flow Status	banks, and minimal amount of	channel; or <25% of channel	channel, and/or riffle substrates are	! *
Channel  Chameler and the common of the depth of some channel carbon may be extensive. However, the common of the stream means the stream mercase, the stream mercase the stream length in 2 times the stream mercase the stream length in 2 times the stream mercase the stream length in 2 times the stream mercase the stream length in 2 times the stream mercase the stream length in 2 times the stream mercase the stream length in 2 times the stream mercase the stream mercase the stream mercase the stream length in 2 times the stream mercase the stream mercase and the stream mercase the stream the stream mercase the strea	SCORE	20 19 18 17 (16)	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note-channel braiding is considered normal in coastal plants and other low-lying areas. This parameter is not eastly rated in these areas.  SCORE 20 19 18 17 16	6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 years) may be present, but recent channelization	Channelization may be extensive; embankments or shoring structures present on both banks; and 40-80% of stream reach channelized and	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or
the stream length 3 to 4 times tonger than if it was in a straight line. (Note-channel braiding is considered normal in coastal plains and other low-bigg areas. This parameter is not easily rated in these areas.  CORE 20 10 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 Moderally unstable, 30-60% of bank in reach has areas of erosion not bank failure absent or minimals. Institute potential for future problems. 5% of bank affected.  Stability score each bank)  Note determine eff or right sade you feeling lowinstream  CORE Right Bank 10 9 7 6 5 4 3 2 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
Bank Stability   Stability   Stability   Store each   Store each   Stability   Store each   Store each   Store each   Stability   Store each   Store each   Stability   Store each   Stability   Store each   Store each   Stability   Store each   Stability   Store each   Store	7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note-channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight	Channel straight; waterway has been channelized for a long
stability (score each bank)  Note: determine of for rights side by facing diswastream  SCORE Left Bank 10 9 7 6 5 4 3 2 1 0  Note Covered to bank affected.  Note than 10 9 7 6 5 4 3 2 1 0  Note than 10 9 8 7 6 5 4 3 2 1 0  Note than 10 9 8 7 6 5 4 3 2 1 0  Note than 10 9 8 7 6 5 4 3 2 1 0  Note than 10 9 8 7 6 5 4 3 2 1 0  Note than 10 9 8 7 6 5 4 3 2 1 0  Note than 10 9 8 7 6 5 4 3 2 1 0  Note than 10 9 8 7 6 5 5 4 3 2 1 0  Note than 10 9 8 7 6 5 5 4 3 2 1 0  Note than 10 9 8 7 6 5 5 4 3 2 1 0  Note than 10 9 8 7 6 5 5 4 3 2 1 0  Note than 10 9 8 7 6 5 5 4 3 2 1 0  Note than 10 9 8 7 6 5 5 4 3 2 1 0  Note than 10 9 8 7 6 5 5 4 3 2 1 0  Note than 10 9 8 7 6 5 5 4 3 2 1 0  Note than 10 9 8 7 6 5 5 4 3 2 1 0  Note than 10 9 8 7 6 5 5 4 3 2 1 0  Note than 10 9 8 7 6 5 5 4 3 2 1 0  Note than 10 9 8 7 6 5 5 4 3 2 1 0  Note than 10 9 8 7 6 5 5 4 3 2 1 0  Note than 10 9 8 7 6 5 5 4 3 2 1 0  Note than 10 9 8 7 6 5 5 4 3 2 1 0  Note than 10 9 8 7 6 5 5 4 3 2 2 1 0  Note than 10 9 8 7 6 5 5 4 3 2 2 1 0  Note than 10 9 8 7 6 5 5 4 3 2 2 1 0  Note than 10 9 8 7 6 5 5 4 3 2 2 1 0  Note than 10 9 8 7 6 5 5 4 3 2 2 1 0  Note than 10 9 8 7 6 5 5 4 3 2 2 1 0  Note than 10 9 8 7 6 5 5 4 3 2 2 1 0  Note than 10 9 8 7 6 5 5 4 3 2 2 1 0  Note than 10 9 8 7 6 5 5 4 3 2 2 1 0  Note than 10 9 8 7 6 5 5 4 3 2 2 1 0  Note than 10 9 8 7 6 5 5 4 3 2 2 1 0  Note than 10 9 8 7 6 5 5 4 3 2 2 1 0  Note than 10 9 8 7 6 5 5 4 3 2 2 1 0  Note than 10 9 8 7 6 5 5 4 3 2 2 1 0  Note than 10 9 8 7 6 5 5 4 3 2 2 1 0  Note than 10 9 8 7 6 5 5 4 3 2 1 0  Note than 10 9 8 7 6 5 5 4 3 2 2 1 0  Note than 10 9 8 7 6 5 5 4 3 2 2 1 0  Note than 10 9 8 7 6 5 5 4 3 2 2 1 0  Note than 10 9 8 7 6 5 5 4 3 2 2 1 0  Note than 10 9 8 7 6 5 5 4 3 2 2 1 0  Note than 10 9 8 7 6 5 5 4 3 2 2 1 0  Note than 10 9 8 7 6 5 5 4 3 2 2 1 0  Note than 10 9 8 7 6 5 5 4 3 2 2 1 0  Note than 10 9 8 7 6 5 5 4 3 2 2 1 0  Note than 10 9 8 7 6 5 5 4 3 2 2 1 0	SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2/1)
Left Bank   10   9   7   6   5   4   3   2   1   0	Stability (score each bank) Note: determine left or right side by facing	little potential for future problems.	healed over. 5-30% of bank in	high erosion potential during	sections and bends; obvious bank sloughing; 60-100% of bank has
Right Bank   10 9	SCORE	Left Bank 10 9	(g) 7 6	5 4 3	2 1 0
More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation; surfaces and immediate riparian zone covered by native vegetation, but one class of plants is not well represented, disruption common; less than one half of the potential plant stubble height remaining.  SCORE  Left Bank 10 9 8 7 6 5 4 3 2 1 0  Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.  Wegetation  Nore than 90% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare sis in twell represented, disruption evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height remaining.  SCORE  Left Bank 10 9 8 7 6 5 4 3 2 1 0  Width of riparian zone >18 meters; human activities have impacted zone only minimally.  Width of riparian zone >18 meters; human activities have impacted zone a great deal.  Width of riparian zone so meters, hittle or no riparian vegetation due to human activity.  Width of riparian zone so meters, hittle or no riparian vegetation due to human activity.  Width of riparian zone so meters, hittle or no riparian vegetation due to human activity.  Width of riparian zone so meters, hittle or no riparian vegetation due to human activities.  Width of riparian zone so meters, hittle or no riparian vegetation due to human activities.  Width of riparian zone so meters, hittle or no riparian vegetation due to human activities.  Width of riparian zone so meters, hittle or no riparian vegetation due to human activities.  Width of riparian zone so meters, hittle or no riparian vegetation due to human activities.	SCORE	Right Bank 10 9	(B) 7 6	5 4 3	2 1 0
Right Bank   10 9   8 7 6   5 4 3   2 1 0	9. Vegetative Protection (score each bank)	surfaces and immediate riparian zone covered by native vegetation, including shrubs, or nonwoody macrophytes; vegeative disruption through grazing or mowing minimal or not evident, almost all plants	surfaces covered by native vegetation, but one class of plants is not well represented; disruption evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height	surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one half of the potential plant stubble height	surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 cm or less
Right Bank 10 9 8 7 6 5 4 3 2 1 0  Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.  Note that the second bank riparian zone bank riparian zone bank riparian zone bank riparian zone.  Right Bank 10 9 8 7 6 5 4 3 2 1 0  Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.  Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.  Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.  Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.  Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.  Score each bank riparian zone.  Score Left Bank 10 9 8 7 6 5 4 3 2 1 0  Score Right Bank 10 9 8 7 6 5 4 3 2 1 0	SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.   Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.   Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.   Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.   Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.   Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.   Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.   Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.   Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.   Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.   Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.   Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.   Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.   Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.   Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.   Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.   Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.   Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.   Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.   Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.   Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.   Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.   Width of riparian zone 6-12 meters; human activities ha	SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE         Left Bank         10         9         8         7         6         5         4         3         2         1         0           CORE         Right Bank         10         9         8         7         6         5         4         3         2         1         0	10. Riparian Vegetative Zone Width (score each bank riparian zone)	human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	meters; human activites have	meters; human activities have	little or no riparian vegetation due
SCORE _ Right Bank 10 9 8 7 6 5 4 3 2 1 0	SCORE	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	E(LTX)	I.	l e e e e e e e e e e e e e e e e e e e		4 -

Stream Name:	Lower	Hounra	's Cree	K	Location: W		5.C04
Station #: 58	3+25	Mile:			Basin/Watersh	ed: LHC	
LAT.:		LONG.:			County: Ch	rk USGS 7	7.5 TOPO:
Date:	21,09 Time:	1:30 AM	(PM)		Investigators:		「ゴ
149	01,0	Type Sam		Macroinver	<u> </u>	Bacteria	
Weather:		Now	Past 24 hours	WideFolliver		heavy rain in la	ngt 7 day w?
weather:		NOW					ist / days?
			θ Heavy Rain		Yes	No )	
Ī			ө Steady Rain		Air Temperatur		•
İ			e Intermittent			in past 24 hours	<u>O</u> in
		•	θ Clear/Sunn		25 % Cloud (	Cover.	
P-Che	em: Temp (°	C) D.O.	(mg/l) %	6Saturation	pH (S.U.)	Cond.	Grab
Instream Wat		Local Waters					
Features:	cisheu	•	urrounding Lan	d Hear			
	125					r	
Stream Width:		e Surface Mini	•	<ul><li>Θ Construction</li></ul>		θ Forest	
Range of Depti		ө Deep Mining	}	e Commercial		ө Pasture / Gra	zing
Average Veloc	ity: <b>0.25</b> ft/s	e Oil Wells		e Industrial		e Silviculture	
Discharge:	cfs	e Land Disposa	al	e Row Crops		e Urban Runof	ff / Storm Sewers
Est. Reach Len	gth: 100	Ì					
Hydraulic Stru		A	Stream Flow:			Stream Type:	
1 '	ө Bridge Abutı	manta		6 Pooled	e Low		Θ Intermittent
θ Dams		ments			θ LOW		
e Island	<ul><li>ω Waterfalls</li></ul>		e Normal	e High		e Ephemeral	ө Ѕсер
Θ Other			θ Very Rapid o	or Torrential			
Riparian Veget	ation:	Dom. Tree / Sh	rub Taxa	Canopy Cover:			Channel Alterations:
Dominate Type	<b>:</b> :			θ Fully Expose	d (0-25%)		e Dredging
ө Trees	e Shrubs		<u>_</u>	e Partially Sha			o Channelization
6 Grasse	e Herbaceous			e Partially Exp		•	(e Full or e Partial)
							Grapor Grantar)
Number of Stra				e Fully Shaded			
Substrate e Est			Riffle_	<u>10</u> %	Run	<u>10 %</u>	Pool <u>80</u> %
Silt / Clay (< 0	.06 mm)		/0_		12		40
Sand (0.06 - 2	mm)		30		30	)	40
Gravel (2 - 64 :	mm)		30		30	)	70
					<del> </del>		<u> </u>
Cobble (64 - 2)	56 mm)		1 70		<b>₹</b> /2	)	1
Cobble (64 - 25			30		30	) 	
Boulders ( > 25			30		30	)	
Boulders ( > 25 Bedrock			30				
Boulders ( > 25 Bedrock Habitat	56 mm)				Category		
Boulders ( > 25 Bedrock	56 mm)	timal		Condition ptimal	Category	ginal	Poor
Boulders ( > 25 Bedrock Habitat	56 mm)		Subo	ptimal	Category	ginal	Poor Less than 20% stable habitat; lack
Boulders ( > 25 Bedrock Habitat	Opi Greater than 70%		<b>Subo</b> 40-70% mix of st	ptimal able habitat; well-	Category Mar	ginal able habitat;	Less than 20% stable habitat; lack of habitat is obvious; substrate
Boulders ( > 29 Bedrock Habitat Parameter	Ope Greater than 70% favorable for epit and fish cover; m	6 of substrate faunal colonization nix of snags,	Subo 40-70% mix of st suited for full col potential; adequa	ptimal able habitat; well- onization te habitat for	Category Mar 20-40% mix of st habitat availabilit desirable; substra	ginal able habitat; y less then te frequently	Less than 20% stable habitat, lack
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal	Ope Greater than 70% favorable for epit and fish cover; m submerged lobs,	6 of substrate faunal colonization nix of snags, undercut banks,	Subo 40-70% mix of st suited for full col potential; adequa maintenance of p	ptimal  able habitat; well- onization te habitat for opulations;	Category Mar 20-40% mix of st	ginal able habitat; y less then te frequently	Less than 20% stable habitat; lack of habitat is obvious; substrate
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate /	Greater than 70% favorable for epit and fish cover; m submerged lobs, cobble or other st	6 of substrate faunal colonization nix of snags, undercut banks, table habitat and	Subo 40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit	ptimal able habitat; well- onization te habitat for opulations; ional substrate in	Category Mar 20-40% mix of st habitat availabilit desirable; substra	ginal able habitat; y less then te frequently	Less than 20% stable habitat; lack of habitat is obvious; substrate
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available	Greater than 70% favorable for epit and fish cover; m submerged lobs, cobble or other st at stage to allow	6 of substrate faunal colonization nix of snags, undercut banks, table habitat and full colonication	Subo 40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa	ptimal able habitat; well- onization te habitat for opulations, ional substrate in all, but not yet	Category Mar 20-40% mix of st habitat availabilit desirable; substra	ginal able habitat; y less then te frequently	Less than 20% stable habitat; lack of habitat is obvious; substrate
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate /	Greater than 70% favorable for epit and fish cover; m submerged lobs, cobble or other st at stage to allow potential (i.e., log	6 of substrate faunal colonization nix of snags, undercut banks, table habitat and full colonication gs/snags that are	Subo 40-70% mix of st suited for full col- potential; adequa maintenance of p presence of addit the form of newfa prepared for colo	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate	Category Mar 20-40% mix of st habitat availabilit desirable; substra	ginal able habitat; y less then te frequently	Less than 20% stable habitat; lack of habitat is obvious; substrate
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available	Greater than 70% favorable for epit and fish cover; m submerged lobs, cobble or other st at stage to allow	6 of substrate faunal colonization nix of snags, undercut banks, table habitat and full colonication gs/snags that are	Subo 40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate	Category Mar 20-40% mix of st habitat availabilit desirable; substra	ginal able habitat; y less then te frequently	Less than 20% stable habitat; lack of habitat is obvious; substrate
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available	Greater than 70% favorable for epit and fish cover; m submerged lobs, cobble or other st at stage to allow potential (i.e., log	6 of substrate faunal colonization nix of snags, undercut banks, table habitat and full colonication gs/snags that are	Subo 40-70% mix of st suited for full col- potential; adequa maintenance of p presence of addit the form of newfa prepared for colo	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate	Category Mar 20-40% mix of st habitat availabilit desirable; substra	ginal able habitat; y less then te frequently	Less than 20% stable habitat; lack of habitat is obvious; substrate
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available	Greater than 70% favorable for epit and fish cover; m submerged lobs, cobble or other st at stage to allow potential (i.e., log not new fall and metal components).	6 of substrate faunal colonization nix of snags, undercut banks, table habitat and full colonication gs/snags that are	Subo 40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate	Category Mar 20-40% mix of st habitat availabilit desirable; substra	ginal able habitat; y less then te frequently	Less than 20% stable habitat; lack of habitat is obvious; substrate
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover	Greater than 70% favorable for epit and fish cover; m submerged lobs, cobble or other st at stage to allow potential (i.e., log not new fall and recommendation).	6 of substrate faunal colonization aix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).	Subo 40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).	Category Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	ginal able habitat; y less then te frequently vved.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover	Greater than 70% favorable for epit and fish cover; m submerged lobs, cobble or other st at stage to allow potential (i.e., log not new fall and a 20 19 1 Mixture of substr	6 of substrate faunal colonization aix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).	Subo 40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sea	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  3 12 11 and, mud, or clay;	Category Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	ginal able habitat; y less then te frequently vved.  8 7 6 r sand bottom;	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover	Greater than 70% favorable for epit and fish cover; m submerged lobs, cobble or other st at stage to allow potential (i.e., log not new fall and a 20 19 1 Mixture of substr	6 of substrate faunal colonization aix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root	Subo 40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sea	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 11 and, mud, or clay; inant; some root	Category Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	ginal able habitat; y less then te frequently vved.  8 7 6 r sand bottom;	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover	Greater than 70% favorable for epit and fish cover; m submerged lobs, cobble or other st at stage to allow potential (i.e., log not new fall and the component of the component	6 of substrate faunal colonization aix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root	Subo 40-70% mix of st suited for full col- potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca  15 14  Mixture of soft sa mud may be dom	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 11 and, mud, or clay; inant; some root	Category Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	ginal able habitat; y less then te frequently vved.  8 7 6 r sand bottom;	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE	Greater than 70% Greater than 70% Greater than 70% Greater than 70% Greater than 70% Greater than 70% Greater than 70% Greater than 70% Greater than 50% Greater than 70% Greate	6 of substrate faunal colonization aix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root	Subo  40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca  15 14  Mixture of soft sc mud may be dom mats and submerg	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 11 and, mud, or clay; inant; some root	Category Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	ginal able habitat; y less then te frequently vved.  8 7 6 r sand bottom;	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate	Greater than 70% Greater than 70% Greater than 70% Greater than 70% Greater than 70% Greater than 70% Greater than 70% Greater than 70% Greater than 50% Greater than 70% Greate	6 of substrate faunal colonization aix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root	Subo  40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca  15 14  Mixture of soft sc mud may be dom mats and submerg	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 11 and, mud, or clay; inant; some root	Category Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	ginal able habitat; y less then te frequently vved.  8 7 6 r sand bottom;	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterizat	Greater than 70% Greater than 70% Greater than 70% Greater than 70% Greater than 70% Greater than 70% Greater than 70% Greater than 70% Greater than 50% Greater than 70% Greate	6 of substrate faunal colonization aix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root	Subo  40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca  15 14  Mixture of soft sc mud may be dom mats and submerg	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 11 and, mud, or clay; inant; some root	Category Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	ginal able habitat; y less then te frequently vved.  8 7 6 r sand bottom;	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterizat ion	Greater than 70% favorable for epit and fish cover; m submerged lobs, cobble or other st at stage to allow potential (i.e., log not new fall and in the stage to allow part and firm st gravel and firm st mats and submergeommon.	6 of substrate faunal colonization aix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root ged vegetation	Subo 40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca  15 14  Mixture of soft sc mud may be dom mats and submers present.	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 11 and, mud, or clay; inant; some root ged vegetation	Category Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo  10 9  All mud or clay o little or no root m vegetation.	ginal able habitat; y less then te frequently vved.  8 7 6 r sand bottom; at; no submerged	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root mat or vegetation.
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterizat	Greater than 70% favorable for epit and fish cover, m submerged lobs, cobble or other st at stage to allow potential (i.e., log not new fall and in 20 19 1 Mixture of substr gravel and firm st mats and submer common.	6 of substrate faunal colonization aix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root	Subo 40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca  15 14  Mixture of soft sc mud may be dom mats and submers present.	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 11 and, mud, or clay; inant; some root	Category Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	ginal able habitat; y less then te frequently vved.  8 7 6 r sand bottom;	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root mat or vegetation.
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterizat ion	Greater than 70% favorable for epit and fish cover; m submerged lobs, cobble or other st at stage to allow potential (i.e., log not new fall and in the stage to allow part and firm st gravel and firm st mats and submergeommon.	6 of substrate faunal colonization aix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root ged vegetation	Subo 40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca  15 14  Mixture of soft sc mud may be dom mats and submers present.	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate alle).  13 12 11 and, mud, or clay; inant; some root ged vegetation	Category Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo  10 9  All mud or clay o little or no root m vegetation.	ginal able habitat; y less then te frequently ved.  8 7 6  r sand bottom; at; no submerged	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root mat or vegetation.
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterizat ion	Greater than 70% favorable for epit and fish cover, m submerged lobs, cobble or other st at stage to allow potential (i.e., log not new fall and in 20 19 1 Mixture of substr gravel and firm st mats and submer common.	6 of substrate faunal colonization aix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root ged vegetation  18 17 16 e-shallow, large-	Subo 40-70% mix of st suited for full col- potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca  15 14  Mixture of soft sa mud may be dom mats and submera present.	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate alle).  13 12 11 and, mud, or clay; inant; some root ged vegetation	Category  Mar  20-40% mix of st habitat availability desirable; substra disturbed or remo  10 9  All mud or clay of little or no root m vegetation.	ginal able habitat; y less then te frequently ved.  8 7 6 r sand bottom; at; no submerged	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root mat or vegetation.
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  2. Pool Substrate Characterizat ion  SCORE  3. Pool	Greater than 70% favorable for epid and fish cover, m submerged lobs, cobble or other si at stage to allow potential (i.e., log not new fall and in 20 19 1 Mixture of substragravel and firm signates and submerground from submergravel and firm signates and submergravel and firm signates and submergravel and firm signates and submergravel and firm signates and submergravel and firm signates and submergravel and firm signates and submergravel and firm signates and submergravely and firm signates and submergravely firm and sub	6 of substrate faunal colonization aix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root ged vegetation  18 17 16 e-shallow, large-	Subo 40-70% mix of st suited for full colpotential; adequa maintenance of presence of addit the form of newfa prepared for colo at high end of sca 15 14 Mixture of soft samud may be dom mats and submera present.	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate alle).  13 12 11 and, mud, or clay; inant; some root ged vegetation	Category  Mar  20-40% mix of st habitat availability desirable; substra disturbed or remo  10 9  All mud or clay o little or no root m vegetation.	ginal able habitat; y less then te frequently ved.  8 7 6 r sand bottom; at; no submerged	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root mat or vegetation.  5 4 3 2 1  Majority of pools small-shallow or
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  2. Pool Substrate Characterizat ion  SCORE	Greater than 70% favorable for epit and fish cover; m submerged lobs, cobble or other st at stage to allow potential (i.e., log not new fall and in the fall and firm st and submerged and firm st mats and submerged and firm st and submerged an	6 of substrate faunal colonization aix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root ged vegetation  18 17 16 e-shallow, large-	Subo 40-70% mix of st suited for full colpotential; adequa maintenance of presence of addit the form of newfa prepared for colo at high end of sca 15 14 Mixture of soft samud may be dom mats and submera present.	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate alle).  13 12 11 and, mud, or clay; inant; some root ged vegetation	Category  Mar  20-40% mix of st habitat availability desirable; substra disturbed or remo  10 9  All mud or clay o little or no root m vegetation.	ginal able habitat; y less then te frequently ved.  8 7 6 r sand bottom; at; no submerged	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root mat or vegetation.  5 4 3 2 1  Majority of pools small-shallow or
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  2. Pool Substrate Characterizat ion  SCORE  3. Pool Variability	Greater than 70% favorable for epit and fish cover; m submerged lobs, cobble or other si at stage to allow potential (i.e., log not new fall and in the subset of the subs	6 of substrate faunal colonization aix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root ged vegetation  18 17 16 e-shallow, large- ow, small-deep	Subo  40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca  15 14  Mixture of soft sc mud may be dom mats and submera present.  15 14  Majority of pool few shallow.	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate alle).  13 12 11 and, mud, or clay; inant; some root ged vegetation  13 12 11 large-deep; very	10 9 All mud or clay o little or no root m vegetation.	ginal able habitat; y less then te frequently wed.  8 7 6  r sand bottom; at; no submerged  8 7 6  ich more ep pools.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root mat or vegetation.  5 4 3 2 1  Majority of pools small-shallow or pools absent
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  2. Pool Substrate Characterizat ion  SCORE  3. Pool Variability  SCORE	Greater than 70% Greate	6 of substrate faunal colonization aix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root ged vegetation  18 17 16 e-shallow, large-	Subo  40-70% mix of state of full colypotential; adequate maintenance of presence of addit the form of newfaprepared for colotat high end of scatter of soft state of soft	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate alle).  13 12 11 and, mud, or clay; inant; some root ged vegetation	Category Mar  20-40% mix of st habitat availabilit desirable; substra disturbed or remo  10 9  All mud or clay o little or no root m vegetation.  10 9  Shallow pools mu prevalent than dec	ginal able habitat; y less then te frequently ved.  8 7 6 r sand bottom; at; no submerged	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root mat or vegetation.  5 4 3 2 1  Majority of pools small-shallow or
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  2. Pool Substrate Characterizat ion  SCORE  3. Pool Variability	Greater than 70% Greate	6 of substrate faunal colonization aix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root ged vegetation  18 17 16 e-shallow, large- ow, small-deep	Subo  40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca  15 14  Mixture of soft sc mud may be dom mats and submera present.  15 14  Majority of pool few shallow.	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate alle).  13 12 11 and, mud, or clay; inant; some root ged vegetation  13 12 11 large-deep; very	10 9 All mud or clay o little or no root m vegetation.	ginal able habitat; y less then te frequently wed.  8 7 6  r sand bottom; at; no submerged  8 7 6  ich more ep pools.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root mat or vegetation.  5 4 3 2 1  Majority of pools small-shallow or pools absent
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  2. Pool Substrate Characterizat ion  SCORE  3. Pool Variability  SCORE	Greater than 70% Greate	6 of substrate faunal colonization aix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root ged vegetation  18 17 16 e-shallow, large- ow, small-deep	Subo  40-70% mix of st suited for full col- potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca  15 14  Mixture of soft sc mud may be dom mats and submera present.  15 14  Majority of pool few shallow.	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate alle).  13 12 11 and, mud, or clay; inant; some root ged vegetation  13 12 11 large-deep; very	10 9 All mud or clay o little or no root m vegetation.	ginal able habitat; y less then te frequently wed.  8 7 6  r sand bottom; at; no submerged  8 7 6  ich more ep pools.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root mat or vegetation.  5 4 3 2 1  Majority of pools small-shallow or pools absent
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  2. Pool Substrate Characterizat ion  SCORE  3. Pool Variability  SCORE	Greater than 70% Greate	6 of substrate faunal colonization aix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root ged vegetation  18 17 16 e-shallow, large- ow, small-deep	Subo  40-70% mix of st suited for full col- potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca  15 14  Mixture of soft sc mud may be dom mats and submera present.  15 14  Majority of pool few shallow.	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate alle).  13 12 11 and, mud, or clay; inant; some root ged vegetation  13 12 11 large-deep; very	10 9 All mud or clay o little or no root m vegetation.	ginal able habitat; y less then te frequently wed.  8 7 6  r sand bottom; at; no submerged  8 7 6  ich more ep pools.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root mat or vegetation.  5 4 3 2 1  Majority of pools small-shallow or pools absent
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  2. Pool Substrate Characterizat ion  SCORE  3. Pool Variability  SCORE	Greater than 70% Greate	6 of substrate faunal colonization aix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root ged vegetation  18 17 16 e-shallow, large- ow, small-deep	Subo  40-70% mix of st suited for full col- potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca  15 14  Mixture of soft sc mud may be dom mats and submera present.  15 14  Majority of pool few shallow.	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate alle).  13 12 11 and, mud, or clay; inant; some root ged vegetation  13 12 11 large-deep; very	10 9 All mud or clay o little or no root m vegetation.	ginal able habitat; y less then te frequently wed.  8 7 6  r sand bottom; at; no submerged  8 7 6  ich more ep pools.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root mat or vegetation.  5 4 3 2 1  Majority of pools small-shallow or pools absent
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  2. Pool Substrate Characterizat ion  SCORE  3. Pool Variability  SCORE	Greater than 70% Greate	6 of substrate faunal colonization aix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root ged vegetation  18 17 16 e-shallow, large- ow, small-deep	Subo  40-70% mix of st suited for full col- potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca  15 14  Mixture of soft sc mud may be dom mats and submera present.  15 14  Majority of pool few shallow.	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate alle).  13 12 11 and, mud, or clay; inant; some root ged vegetation  13 12 11 large-deep; very	10 9 All mud or clay o little or no root m vegetation.	ginal able habitat; y less then te frequently wed.  8 7 6  r sand bottom; at; no submerged  8 7 6  ich more ep pools.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root mat or vegetation.  5 4 3 2 1  Majority of pools small-shallow or pools absent

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand, or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	increased bar development; more
SCORE	20 19 18 17 16	15 14 13 12 11	(10) 9 8 7 6	5 4 3 2 1
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	
SCORE	20 19 18 17 16	15 14 13 12 (11)	10 9 8 7 6	5 4 3 2 1
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 years) may be present, but recent channelization is not present.	present on both banks; and 40-80% of stream reach channelized and	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note-channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 (2) 1
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderatly unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB)	Left Bank 10 9	8 7 6	<b>3</b> 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	(5) 4 3	2 1 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including shrubs, or nonwoody macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	extent; more than one half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 cm or less in stubble height.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 (3)	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 (3)	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian		Width of riparian zone 12-18 meters; human activites have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters, little or no riparian vegetation due to human activity.
zone) SCORE	Left Bank 10 9	8 7 6	5 4 3	2 (1) 0
(LB)		8 7 6		
SCORE (RB)	Right Bank 10 9	0 / 0	5 4 3	2 (1) 0

Stream Name:	Lower	Howard's	Creek		Location: W	カレ	<i>5,</i>	C, -05	5
Station #: (a/	0+40	Mile:			Basin/Watershed: LHC				
LAT.:		LONG.:			County: Cla	irK	USGS 7	7.5 TOPO:	
Date: 7/28	O8 Time:	AM	PM		Investigators:	LH	<b>4</b> 3	7.7	
		Type Sam	ple: P-Chem	Macroinvert	tebrate Fish	Bact	eria		
Weather:		Now	Past 24 hours		Has there been	heavy	ain in la	st 7 days?	
İ			ө Heavy Rain	(	Yes	No			
			Θ Steady Rain		Air Temperatu	ге <u>Ъ</u> 5°	F.		
1		,	o Intermittent	Showers	Inches rainfall	in past	24 hours	. 2 in	
		,	6 Clear/Sunny		ZO % Cloud	Cover.			
P-Che	em: Temp (°C	C) D.O.	(mg/l) %	6Saturation	pH (S.U.)	(	ond.	Grab	
Instream Wat		Local Waters	hed Features:		<del></del>				
Features:	,		urrounding Lan	d Use:					
Stream Width:	7'	e Surface Mini		e Construction	<del></del>	e Fore	> <b>†</b>		-
Range of Deptl	3	θ Deep Mining	•	e Commercial		1	ire / Gra	zina	
		θ Oil Wells	5	e Industrial			culture	znig	
Average Veloc			- 1		,		-	f / Storm Sew	
Discharge:	cfs	e Land Dispos	aı	ө Row Crops	•	ө Огра	n Kunoi	1 / Storitt Sew	ers )
Est. Reach Len		<u> </u>	To	<u> </u>					
Hydraulic Stru			Stream Flow:			Stream			_
I -	Bridge Abuti	ments >		θ Pooled	e Low	e Perei		Intermitten	
e Island	<ul><li>ω Waterfalls</li></ul>		e Normal	θ High		e Ephe	meral	ө Ѕеер	
ө Other			ө Very Rapid o	or Torrential					
Riparian Veget	tation:	Dom. Tree / Sh	rub Taxa	Canopy Cover:				Channel Alte	erations:
Dominate Type				ө Fully Expose	d (0-25%)			<ul><li>θ Dredging</li></ul>	
ө Trees	Shrubs	Lonice	ra	θ Partially Sha				e Channeliza	ition
e Grasses	<b>Herbaceous</b>			Partially Exp	osed (50-75%)	)		(e Full or e F	Partial)
Number of Stra	ata 3			e Fully Shaded	(75-100%)			•	
Substrate e Est	. ө Р.С.		Riffle ,	34 %	Run	33 %	,	Pool	33 %
Silt / Clay (< 0	.06 mm)								
Sand (0.06 - 2	mm)		<b>Z</b> 5		Z	5			50
Gravel (2 - 64	mm)		50		5			Z	
	···								
Cobble (64 - 2)	56 mm)		25		25	5		2	5
Cobble $(64 - 2)$ Boulders $( > 2)$	<del></del>		25		<u> </u>	5		2	5
Cobble (64 - 2) Boulders ( > 2) Bedrock	<del></del>		25		25	5		2	5
Boulders ( > 2: Bedrock	<del></del>		25	Condition		5		2	5
Boulders ( > 2: Bedrock Habitat	56 mm)	timal			Category				
Boulders ( > 2: Bedrock	56 mm)	timal	Subo	ptimal	Category Mar	ginal	tat		Poor
Boulders ( > 2: Bedrock Habitat	56 mm) Opt	of substrate	Subo 40-70% mix of st	ptimal able habitat; well-	Category Mar 20-40% mix of st	<b>ginal</b> able habi		Less than 20%	Poor stable habitat; lack
Boulders ( > 2: Bedrock Habitat Parameter	Opt Greater than 70% favorable for epif	of substrate aunal colonization	Subo 40-70% mix of st suited for full col	ptimal able habitat; well- onization	Category Mar 20-40% mix of st habitat availabilit	ginal able habi y less the	n	Less than 20%	Poor stable habitat; lack vious; substrate
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal	56 mm) Opt	of substrate aunal colonization ix of snags,	Subo 40-70% mix of st	ptimal able habitat; well- onization te habitat for	Category Mar 20-40% mix of st	ginal able habi y less the ite freque	n	Less than 20% of habitat is ob	Poor stable habitat; lack vious; substrate
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate /	Opt Greater than 70% favorable for epif and fish cover; m submerged lobs, cobble or other st	of substrate faunal colonization ix of snags, undercut banks, table habitat and	Subo 40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit	ptimal able habitat; well- onization te habitat for opulations; ional substrate in	Category Mar 20-40% mix of st habitat availabilit desirable; substra	ginal able habi y less the ite freque	n	Less than 20% of habitat is ob	Poor stable habitat; lack vious; substrate
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available	Greater than 70% favorable for epif and fish cover; m submerged lobs, cobble or other st at stage to allow	of substrate faunal colonization ix of snags, undercut banks, table habitat and full colonication	Subo 40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet	Category Mar 20-40% mix of st habitat availabilit desirable; substra	ginal able habi y less the ite freque	n	Less than 20% of habitat is ob	Poor stable habitat; lack vious; substrate
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate /	Greater than 70% favorable for epif and fish cover; m submerged lobs, cobble or other st at stage to allow potential (i.e., log	of substrate Taunal colonization ix of snags, undercut banks, table habitat and full colonication gs/snags that are	Subo 40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate	Category Mar 20-40% mix of st habitat availabilit desirable; substra	ginal able habi y less the ite freque	n	Less than 20% of habitat is ob	Poor stable habitat; lack vious; substrate
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available	Greater than 70% favorable for epif and fish cover; m submerged lobs, cobble or other st at stage to allow	of substrate Taunal colonization ix of snags, undercut banks, table habitat and full colonication gs/snags that are	Subo 40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate	Category Mar 20-40% mix of st habitat availabilit desirable; substra	ginal able habi y less the ite freque	n	Less than 20% of habitat is ob	Poor stable habitat; lack vious; substrate
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover	Greater than 70% favorable for epif and fish cover; m submerged lobs, cobble or other st at stage to allow potential (i.e., log not new fall and i	of substrate faunal colonization ix of snags, undercut banks, table habitat and full colonication sy/snags that are not transient).	Subo 40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate alle).	Category Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	ginal able habi y less the ite freque oved.	en ntly	Less than 20% of habitat is ob unstable or lack	Poor stable habitat; lack vious; substrate
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available	Greater than 70% favorable for epif and fish cover; m submerged lobs, cobble or other st at stage to allow potential (i.e., log not new fall and 1	of substrate faunal colonization ix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).	Subo 40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rafe ale).	Category Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	ginal able habi y less the te freque ved.	en ntly	Less than 20% of habitat is ob unstable or lack	Poor stable habitat; lack vious; substrate king.
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover	Greater than 70% favorable for epif and fish cover; m submerged lobs, cobble or other st at stage to allow potential (i.e., log not new fall and the cobble of the cobble or other stage to allow potential (i.e., log not new fall and the cobble or other stage to allow potential (i.e., log not new fall and the cobble or other stage).	of substrate faunal colonization ix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  8 17 16 ate materials, with	Subo  40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca  15 14  Mixture of soft sa	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  3 12 11 and, mud, or clay;	Category Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	ginal able habi y less the ste freque oved.  8 7	en ntly 6 ottom;	Less than 20% of habitat is ob unstable or lack	Poor stable habitat; lack vious; substrate king.  3 2 1 or bedrock; no root
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover	Greater than 70% favorable for epif and fish cover; m submerged lobs, cobble or other st at stage to allow potential (i.e., log not new fall and 1	of substrate caunal colonization ix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  8 17 16 ate materials, with and prevalent; root	Subo  40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca  15 14  Mixture of soft sr mud may be dom	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 11 and, mud, or clay; inant; some root	Category Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	ginal able habi y less the ste freque oved.  8 7	en ntly 6 ottom;	Less than 20% of habitat is ob unstable or lack	Poor stable habitat; lack vious; substrate king.  3 2 1 or bedrock; no root
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover	Greater than 70% favorable for epif and fish cover; m submerged lobs, cobble or other st at stage to allow potential (i.e., log not new fall and the cobble of the cobble or other stage to allow potential (i.e., log not new fall and the cobble or other stage to allow potential (i.e., log not new fall and the cobble or other stage).	of substrate caunal colonization ix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  8 17 16 ate materials, with and prevalent; root	Subo  40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca  15 14  Mixture of soft sa	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 11 and, mud, or clay; inant; some root	Category Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	ginal able habi y less the ste freque oved.  8 7	en ntly 6 ottom;	Less than 20% of habitat is ob unstable or lack	Poor stable habitat; lack vious; substrate king.  3 2 1 or bedrock; no root
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool	Greater than 70% favorable for epid and fish cover; m submerged lobs, cobble or other st at stage to allow potential (i.e., log not new fall and 1 20 19 1 Mixture of substr gravel and firm se mats and submerg common.	of substrate caunal colonization ix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  8 17 16 ate materials, with and prevalent; root	Subo  40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca  15 14  Mixture of soft st mud may be dom mats and submerg	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 11 and, mud, or clay; inant; some root	Category Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	ginal able habi y less the ste freque oved.  8 7	en ntly 6 ottom;	Less than 20% of habitat is ob unstable or lack	Poor stable habitat; lack vious; substrate king.  3 2 1 or bedrock; no root
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate	Greater than 70% favorable for epid and fish cover; m submerged lobs, cobble or other st at stage to allow potential (i.e., log not new fall and 1 20 19 1 Mixture of substr gravel and firm se mats and submerg common.	of substrate caunal colonization ix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  8 17 16 ate materials, with and prevalent; root	Subo  40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca  15 14  Mixture of soft st mud may be dom mats and submerg	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 11 and, mud, or clay; inant; some root	Category Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	ginal able habi y less the ste freque oved.  8 7	en ntly 6 ottom;	Less than 20% of habitat is ob unstable or lack	Poor stable habitat; lack vious; substrate king.  3 2 1 or bedrock; no root
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterizat	Greater than 70% favorable for epid and fish cover; m submerged lobs, cobble or other st at stage to allow potential (i.e., log not new fall and 1 20 19 1 Mixture of substr gravel and firm se mats and submerg common.	of substrate caunal colonization ix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  8 17 16 ate materials, with and prevalent; root	Subo  40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca  15 14  Mixture of soft st mud may be dom mats and submerg	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 11 and, mud, or clay; inant; some root	Category Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	ginal able habi y less the ste freque oved.  8 7	en ntly 6 ottom;	Less than 20% of habitat is ob unstable or lack	Poor stable habitat; lack vious; substrate king.  3 2 1 or bedrock; no root
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterization	Greater than 70% favorable for epif and fish cover; m submerged lobs, cobble or other st at stage to allow potential (i.e., log not new fall and i Mixture of substr gravel and firm se mats and submerg common.	of substrate faunal colonization ix of snags, undercut banks, table habitat and full colonication gy/snags that are not transient).  8 17 16 ate materials, with and prevalent; root ged vegetation	Subo  40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca  15 14  Mixture of soft sa mud may be dom mats and submera present.	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rafe ale).  3 12 11 and, mud, or clay; inant; some root ged vegetation	Category  Mar  20-40% mix of st habitat availabilit desirable; substra disturbed or remo	ginal able habi y less the ste freque oved.  8 7	en ntly 6 ottom;	Less than 20% of habitat is ob unstable or lack	Poor stable habitat; lack vious; substrate king.  3 2 1 or bedrock; no root
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterizat	Greater than 70% favorable for epif and fish cover; m submerged lobs, cobble or other st at stage to allow potential (i.e., log not new fall and to a low fall and to a low fall and submergravel and firm so mats and submergravel so mats an	of substrate faunal colonization ix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  8 17 16 ate materials, with and prevalent; root ged vegetation	Subo 40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sea  15 14  Mixture of soft se mud may be dom mats and submer present.	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 11 and, mud, or clay; inant; some root ged vegetation	Category  Mar  20-40% mix of st habitat availabilit desirable; substra disturbed or remo	ginal able habi y less the te freque oved.  8 7  or sand be hat; no sui	en ntly 6 ottom;	Less than 20% of habitat is ob unstable or lack that is obtained by the second	Poor stable habitat; lack vious; substrate king.  3 2 1 or bedrock; no root on.
Boulders ( > 2: Bedrock Habitat Parameter  I. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterization  SCORE	Greater than 70% favorable for epif and fish cover; m submerged lobs, cobble or other st at stage to allow potential (i.e., log not new fall and to a low fall and to a low fall and to a low fall and to a low fall and firm so mats and submergravel and submergravel and submergravel and submergravel and submergravel and submergravel and submergravel and submergravel and submergravel and submergravel and submergravel and submergravel and submergravel and submergravel submergravel and submergravel and submergravel and submergravel submergravel and submergravel submergravel submergravel submergravel submergravel submergravel submergravel submergravel submergravel submergravel submergravel submergravel submergravel submergravel submergravel submergravel submergravel submergravel subme	of substrate faunal colonization ix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  8 17 16 ate materials, with and prevalent; root ged vegetation  8 17 16shallow, large-	Subo  40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca 15 14 Mixture of soft sa mud may be dom mats and submers present.	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 11 and, mud, or clay; inant; some root ged vegetation	Category  Mar  20-40% mix of st habitat availabilit desirable; substra disturbed or remo  10 9  All mud or clay of little or no root m vegetation.	ginal able habit y less the ste freque oved.  8 7 or sand be sat; no suit	en ntly 6 ottom;	Less than 20% of habitat is ob unstable or lack that is obtained by the second	Poor stable habitat; lack vious; substrate king.  3 2 1 or bedrock; no root
Boulders ( > 2: Bedrock Habitat Parameter  I. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterization  SCORE  3. Pool	Greater than 70% favorable for epif and fish cover; m submerged lobs, cobble or other st at stage to allow potential (i.e., log not new fall and a material stage to substrate of substrate and submergravel and firm so mats and submergravel and firm so mats and submergravel and firm so material submergravel and firm so material submergravel and firm so material submergravel and firm so material submergravel and firm so material submergravel and firm so material submergravel and firm so material submergravel and firm so material submergravely and submergravely submergravel	of substrate faunal colonization ix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  8 17 16 ate materials, with and prevalent; root ged vegetation  8 17 16shallow, large-	Subo 40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sea  15 14  Mixture of soft se mud may be dom mats and submer present.	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 11 and, mud, or clay; inant; some root ged vegetation	Category  Mar  20-40% mix of st habitat availabilit desirable; substra disturbed or remo	ginal able habit y less the ste freque oved.  8 7 or sand be sat; no suit	en ntly 6 ottom;	Less than 20% of habitat is ob unstable or lack that is obtained by the second	Poor stable habitat; lack vious; substrate king.  3 2 1 or bedrock; no root on.
Boulders ( > 2: Bedrock Habitat Parameter  I. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterization  SCORE	Greater than 70% favorable for epif and fish cover; m submerged lobs, cobble or other st at stage to allow potential (i.e., log not new fall and to a low fall and to a low fall and to a low fall and to a low fall and firm so mats and submergravel and submergravel and submergravel and submergravel and submergravel and submergravel and submergravel and submergravel and submergravel and submergravel and submergravel and submergravel and submergravel and submergravel submergravel and submergravel and submergravel and submergravel submergravel and submergravel submergravel submergravel submergravel submergravel submergravel submergravel submergravel submergravel submergravel submergravel submergravel submergravel submergravel submergravel submergravel submergravel submergravel subme	of substrate faunal colonization ix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  8 17 16 ate materials, with and prevalent; root ged vegetation  8 17 16shallow, large-	Subo  40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca 15 14 Mixture of soft sa mud may be dom mats and submers present.	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 11 and, mud, or clay; inant; some root ged vegetation	Category  Mar  20-40% mix of st habitat availabilit desirable; substra disturbed or remo  10 9  All mud or clay of little or no root m vegetation.	ginal able habit y less the ste freque oved.  8 7 or sand be sat; no suit	en ntly 6 ottom;	Less than 20% of habitat is ob unstable or lack that is obtained by the second	Poor stable habitat; lack vious; substrate king.  3 2 1 or bedrock; no root on.
Boulders ( > 2: Bedrock Habitat Parameter  I. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterization  SCORE  3. Pool	Greater than 70% favorable for epif and fish cover; m submerged lobs, cobble or other st at stage to allow potential (i.e., log not new fall and a material stage to substrate of substrate and submergravel and firm so mats and submergravel and firm so mats and submergravel and firm so material submergravel and firm so material submergravel and firm so material submergravel and firm so material submergravel and firm so material submergravel and firm so material submergravel and firm so material submergravel and firm so material submergravely and submergravely submergravel	of substrate faunal colonization ix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  8 17 16 ate materials, with and prevalent; root ged vegetation  8 17 16shallow, large-	Subo  40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca 15 14 Mixture of soft sa mud may be dom mats and submers present.	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 11 and, mud, or clay; inant; some root ged vegetation	Category  Mar  20-40% mix of st habitat availabilit desirable; substra disturbed or remo  10 9  All mud or clay of little or no root m vegetation.	ginal able habit y less the ste freque oved.  8 7 or sand be sat; no suit	en ntly 6 ottom;	Less than 20% of habitat is ob unstable or lack that is obtained by the second	Poor stable habitat; lack vious; substrate king.  3 2 1 or bedrock; no root on.
Boulders ( > 2: Bedrock Habitat Parameter  I. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterization  SCORE  3. Pool	Greater than 70% favorable for epif and fish cover; m submerged lobs, cobble or other st at stage to allow potential (i.e., log not new fall and in the submerged and firm so mats and submerged and submerged a	of substrate faunal colonization ix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  8 17 16 ate materials, with and prevalent; root ged vegetation  8 17 16shallow, large-	Subo  40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca 15 14 Mixture of soft st mud may be dom mats and submera present.  15 14 Majority of pool few shallow.	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 11 and, mud, or clay; inant; some root ged vegetation	Category  Mar  20-40% mix of st habitat availabilit desirable; substra disturbed or remo  10 9  All mud or clay of little or no root m vegetation.	ginal able habit y less the ste freque oved.  8 7 or sand be sat; no suit	en ntly 6 ottom;	Less than 20% of habitat is ob unstable or lack that is obtained by the second	Poor stable habitat; lack vious; substrate king.  3 2 1 or bedrock; no root on.
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterization  SCORE  3. Pool Variability	Greater than 70% favorable for epid and fish cover; m submerged lobs, cobble or other st at stage to allow potential (i.e., log not new fall and in the submerged and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and semant	of substrate faunal colonization ix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  8 17 16 ate materials, with and prevalent; root ged vegetation  8 17 16shallow, large- ow, small-deep	Subo  40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca 15 14 Mixture of soft st mud may be dom mats and submera present.  15 14 Majority of pool few shallow.	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 11 and, mud, or clay; inant; some root ged vegetation	Category  Mar  20-40% mix of st habitat availabilit desirable; substra disturbed or remo  10 9  All mod or clay of little or no root m vegetation.	ginal able habity less the steep frequence oved.  8 7 or sand be lat; no suite frequence oved.  8 7 or sand be lat; no suite frequence oved.	en ntly 6 ottom;	Less than 20% of habitat is ob unstable or lack unstable or lack that is a second to be unstable or lack that is a second to be unstable or lack that is a second to be unstable or vegetation of the unstable	Poor  stable habitat; lack vious; substrate king.  3 2 1 or bedrock; no root on.  3 2 1 ols small-shallow or
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterizat ion  SCORE  3. Pool Variability	Greater than 70% favorable for epid and fish cover; m submerged lobs, cobble or other st at stage to allow potential (i.e., log not new fall and in the submerged and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and semant	of substrate faunal colonization ix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  8 17 16 ate materials, with and prevalent; root ged vegetation  8 17 16shallow, large- ow, small-deep	Subo  40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca 15 14 Mixture of soft st mud may be dom mats and submera present.  15 14 Majority of pool few shallow.	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 11 and, mud, or clay; inant; some root ged vegetation	Category  Mar  20-40% mix of st habitat availabilit desirable; substra disturbed or remo  10 9  All mod or clay of little or no root m vegetation.	ginal able habity less the steep frequence oved.  8 7 or sand be lat; no suite frequence oved.  8 7 or sand be lat; no suite frequence oved.	en ntly 6 ottom;	Less than 20% of habitat is ob unstable or lack unstable or lack that is a second to be unstable or lack that is a second to be unstable or lack that is a second to be unstable or vegetation of the unstable	Poor  stable habitat; lack vious; substrate king.  3 2 1 or bedrock; no root on.  3 2 1 ols small-shallow or
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterization  SCORE  3. Pool Variability	Greater than 70% favorable for epid and fish cover; m submerged lobs, cobble or other st at stage to allow potential (i.e., log not new fall and in the submerged and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and semant	of substrate faunal colonization ix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  8 17 16 ate materials, with and prevalent; root ged vegetation  8 17 16shallow, large- ow, small-deep	Subo  40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca 15 14 Mixture of soft st mud may be dom mats and submera present.  15 14 Majority of pool few shallow.	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 11 and, mud, or clay; inant; some root ged vegetation	Category  Mar  20-40% mix of st habitat availabilit desirable; substra disturbed or remo  10 9  All mod or clay of little or no root m vegetation.	ginal able habity less the steep frequence oved.  8 7 or sand be lat; no suite frequence oved.  8 7 or sand be lat; no suite frequence oved.	en ntly 6 ottom;	Less than 20% of habitat is ob unstable or lack unstable or lack that is a second to be unstable or lack that is a second to be unstable or lack that is a second to be unstable or vegetation of the unstable	Poor  stable habitat; lack vious; substrate king.  3 2 1 or bedrock; no root on.  3 2 1 ols small-shallow or
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterization  SCORE  3. Pool Variability	Greater than 70% favorable for epid and fish cover; m submerged lobs, cobble or other st at stage to allow potential (i.e., log not new fall and in the submerged and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and semant	of substrate faunal colonization ix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  8 17 16 ate materials, with and prevalent; root ged vegetation  8 17 16shallow, large- ow, small-deep	Subo  40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca 15 14 Mixture of soft st mud may be dom mats and submera present.  15 14 Majority of pool few shallow.	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 11 and, mud, or clay; inant; some root ged vegetation	Category  Mar  20-40% mix of st habitat availabilit desirable; substra disturbed or remo  10 9  All mod or clay of little or no root m vegetation.	ginal able habity less the steep frequence oved.  8 7 or sand be lat; no suite frequence oved.  8 7 or sand be lat; no suite frequence oved.	en ntly 6 ottom;	Less than 20% of habitat is ob unstable or lack unstable or lack that is a second to be unstable or lack that is a second to be unstable or lack that is a second to be unstable or vegetation of the unstable	Poor  stable habitat; lack vious; substrate king.  3 2 1 or bedrock; no root on.  3 2 1 ols small-shallow or
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterization  SCORE  3. Pool Variability	Greater than 70% favorable for epid and fish cover; m submerged lobs, cobble or other st at stage to allow potential (i.e., log not new fall and in the submerged and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semats and submergravel and firm semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and submergravel and semants and semant	of substrate faunal colonization ix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  8 17 16 ate materials, with and prevalent; root ged vegetation  8 17 16shallow, large- ow, small-deep	Subo  40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca 15 14 Mixture of soft st mud may be dom mats and submera present.  15 14 Majority of pool few shallow.	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 11 and, mud, or clay; inant; some root ged vegetation	Category  Mar  20-40% mix of st habitat availabilit desirable; substra disturbed or remo  10 9  All mod or clay of little or no root m vegetation.	ginal able habity less the steep frequence oved.  8 7 or sand be lat; no suite frequence oved.  8 7 or sand be lat; no suite frequence oved.	en ntly 6 ottom;	Less than 20% of habitat is ob unstable or lack unstable or lack that is a second to be unstable or lack that is a second to be unstable or lack that is a second to be unstable or vegetation of the unstable	Poor  stable habitat; lack vious; substrate king.  3 2 1 or bedrock; no root on.  3 2 1 ols small-shallow or

	Little or no enlargement of islands	Some new increase in bar	Moderate deposition of new gravel,	
	or point bars and less than 5%	formation, mostly from gravel,	sand or fine sediment on old and	increased bar development; more
	(<20% for low-gradient streams) of	1 ' ' '	new bars; 30-50% (50-80% for low	
4. Sediment	the bottom affected by sediment	50% for low-gradient) of the	gradient) of the bottom affected;	of the bottom changing frequently
Deposition	deposition.	bottom affected; slight deposition	sediment deposits at obstructions,	pools almost absent due to
		in pools.	constrictions, and bends; moderate	substantial sediment deposition.
1			deposition of pools prevalent.	
SCORE	20 19 18 17 16	15 14 13 12 11	10/9876	5 4 3 2 1
5. Channel	Water reaches base of both lower	Water fills >75% of the available	Water fills 25-75% of the available	Very little water in channel and
Flow Status	banks, and minimal amount of	channel; or <25% of channel	channel, and/or riffle substrates are	mostly present as standing pools.
riow Status	channel substrate is exposed	substrate is exposed.	mostly exposed.	
				i i
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
	Channelization or dredging absent	Some channelization present,	Channelization may be extensive;	Banks shored with gabion or
i	or minimal; stream with normal	usually in areas of bridge		cement; over 80% of the stream
, ,,	pattern.	abutments; evidence of past	present on both banks; and 40-80%	· ·
6. Channel	pattern	channelization, i.e., dredging,	of stream reach channelized and	Instream habitat greatly altered or
Alteration	1	(greater than past 20 years) may be		removed entirely.
		present, but recent channelization	and aprode	removed entirely:
		is not present.		
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 (6)	5 4 3 2 1
	The bends in the stream increase	The bends in the stream increase	The bends in the stream increase	Channel straight; waterway has
	the stream length 3 to 4 times	the stream length 1 to 2 times	the stream length 1 to 2 times	been channelized for a long
	longer than if it was in a straight	longer than if it was in a straight	longer than if it was in a straight	distance
	line. (Note-channel braiding is	line.	line.	distance
7. Channel	considered normal in coastal plains			1
Sinuosity	and other low-lying areas. This			]
	parameter is not easily rated in			
	these areas.			
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
OCORD_	Banks stable; evidence of erosion	Moderately stable; infrequent,	Moderatly unstable; 30-60% of	Unstable; many eroded areas;
8. Bank	or bank failure absent or minimal;	small areas of erosion mostly	bank in reach has areas of erosion;	"raw" areas frequent along straight
Stability	little potential for future problems.	healed over. 5-30% of bank in	high erosion potential during	sections and bends; obvious bank
(score each	<5% of bank affected.	reach has areas of erosion.	floods.	sloughing; 60-100% of bank has
bank)	15 / t Of Odilic directed.	reach has areas of endaton.	noous.	erosional scars.
Note: determine				erosional sears.
left or right side				
by facing				
downstream	6			
SCORE	Left Bank 10 (9)	8 7 6	5 4 3	2 1 0
(LB)		, ,		2 1 0
SCORE	Right Bank 10 9	8 7 6	5 4 3	2 1 0
(RB)	1	, , <u>,</u>	]	2 1 0
	More than 90% of the streambank	70-90% of the streambank	50-70% of the streambank	Less than 50% of the streambank
	surfaces and immediate riparian	surfaces covered by native	surfaces covered by vegetation;	surfaces covered by vegetation;
0.37	zone covered by native vegetation,	vegetation, but one class of plants	disruption obvious; patches of bare	disruption of streambank
9. Vegetative	including chrubs or news	is not well represented; disruption	soil or closely cropped vegetation	vegetation is very high; vegetation
Protection	including shrubs, or nonwoody			
	macrophytes; vegeative disruption	evident but not affecting full plant	common; less than one half of the	has been removed to 5 cm or less
(score each		evident but not affecting full plant	, ,, ,,	has been removed to 5 cm or less in stubble height.
(score each bank)	macrophytes; vegeative disruption	evident but not affecting full plant	common; less than one half of the	J
`	macrophytes; vegeative disruption through grazing or mowing minimal	evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height	common; less than one half of the potential plant stubble height	J
`	macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants	evident but not affecting full plant growth potential to any great extent; more than one half of the	common; less than one half of the potential plant stubble height	J
`	macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants	evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height	common; less than one half of the potential plant stubble height	J
SCORE(LB)	macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9	evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height remaining 8 7 6	common; less than one half of the potential plant stubble height remaining.	in stubble height.
SCORE	macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height remaining	common; less than one half of the potential plant stubble height remaining.	in stubble height.
SCORE(LB)	macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9	evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height remaining 8 7 6	common; less than one half of the potential plant stubble height remaining.  5 4 3  5 4 3	in stubble height.
SCORE	macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9  Width of riparian zone >18 meters;	evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height remaining 8 7 6 8 7 6 Width of riparian zone 12-18	common; less than one half of the potential plant stubble height remaining.  5 4 3  5 4 3  Width of riparian zone 6-12	in stubble height.  2 1 0  2 1 0  Width of riparian zone <6 meters,
SCORE	macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9  Width of riparian zone >18 meters; human activities (i.e., parking lots,	evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height remaining 8 7 6 8 7 6 Width of riparian zone 12-18 meters; human activites have	common; less than one half of the potential plant stubble height remaining.  5 4 3  5 4 3	in stubble height.  2 1 0  2 1 0  Width of riparian zone <6 meters, little or no riparian vegetation due
SCORE	macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9  Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or	evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height remaining 8 7 6 8 7 6 Width of riparian zone 12-18	common; less than one half of the potential plant stubble height remaining.  5 4 3  5 4 3  Width of riparian zone 6-12	in stubble height.  2 1 0  2 1 0  Width of riparian zone <6 meters,
SCORE	macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9  Width of riparian zone >18 meters; human activities (i.e., parking lots,	evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height remaining 8 7 6 8 7 6 Width of riparian zone 12-18 meters; human activites have	common; less than one half of the potential plant stubble height remaining.  5 4 3  Width of riparian zone 6-12 meters; human activities have	in stubble height.  2 1 0  2 1 0  Width of riparian zone <6 meters, little or no riparian vegetation due
SCORE	macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9  Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or	evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height remaining 8 7 6 8 7 6 Width of riparian zone 12-18 meters; human activites have	common; less than one half of the potential plant stubble height remaining.  5 4 3  Width of riparian zone 6-12 meters; human activities have	in stubble height.  2 1 0  2 1 0  Width of riparian zone <6 meters, little or no riparian vegetation due
SCORE	macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9  Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or	evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height remaining 8 7 6 8 7 6 Width of riparian zone 12-18 meters; human activites have	common; less than one half of the potential plant stubble height remaining.  5 4 3  Width of riparian zone 6-12 meters; human activities have	in stubble height.  2 1 0  2 1 0  Width of riparian zone <6 meters, little or no riparian vegetation due
SCORE	macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9  Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or	evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height remaining 8 7 6 8 7 6 Width of riparian zone 12-18 meters; human activites have	common; less than one half of the potential plant stubble height remaining.  5 4 3  Width of riparian zone 6-12 meters; human activities have	in stubble height.  2 1 0  2 1 0  Width of riparian zone <6 meters, little or no riparian vegetation due
SCORE (LB) SCORE (RB)  10. Riparian Vegetative Zone Width (score each	macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9  Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height remaining 8 7 6 8 7 6 Width of riparian zone 12-18 meters; human activites have	common; less than one half of the potential plant stubble height remaining.  5 4 3  Width of riparian zone 6-12 meters; human activities have	in stubble height.  2 1 0  2 1 0  Width of riparian zone <6 meters, little or no riparian vegetation due
SCORE	macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9  Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height remaining 8 7 6 8 7 6 Width of riparian zone 12-18 meters; human activites have	common; less than one half of the potential plant stubble height remaining.  5 4 3  Width of riparian zone 6-12 meters; human activities have	in stubble height.  2 1 0  2 1 0  Width of riparian zone <6 meters, little or no riparian vegetation due
SCORE	macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9  Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height remaining 8 7 6 8 7 6 Width of riparian zone 12-18 meters; human activites have impacted zone only minimally.	common; less than one half of the potential plant stubble height remaining.  5 4 3  Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	in stubble height.  2 1 0  2 1 0  Width of riparian zone <6 meters, little or no riparian vegetation due to human activity.
SCORE	macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9  Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height remaining 8 7 6 8 7 6 Width of riparian zone 12-18 meters; human activites have	common; less than one half of the potential plant stubble height remaining.  5 4 3  Width of riparian zone 6-12 meters; human activities have	in stubble height.  2 1 0  2 1 0  Width of riparian zone <6 meters, little or no riparian vegetation due
SCORE	macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9  Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.  Left Bank 10 9	evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height remaining 8 7 6 8 7 6 Width of riparian zone 12-18 meters; human activites have impacted zone only minimally.	common; less than one half of the potential plant stubble height remaining.  5 4 3  Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	in stubble height.  2 1 0 2 1 0  Width of riparian zone <6 meters, little or no riparian vegetation due to human activity.
SCORE	macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9  Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height remaining 8 7 6 8 7 6 Width of riparian zone 12-18 meters; human activites have impacted zone only minimally.	common; less than one half of the potential plant stubble height remaining.  5 4 3  Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	in stubble height.  2 1 0  2 1 0  Width of riparian zone <6 meters, little or no riparian vegetation due to human activity.

Stream Name:	Cower	Howards	Creek		Location:	5.C0	Ь
Station #: /o./	6+20	Mile:			Basin/Watersho		
LAT.:		LONG.:			County: Clar	-K USGS 7	.5 TOPO:
Date: 7/28	08 Time:	AM	PM		Investigators:	453	
	, <u> </u>	Type Sam	ple: P-Chem	Macroinvert	ebrate Fish	Bacteria	
Weather:		Now	Past 24 hours		Has there been	heavy rain in la	st 7 days?
CI.	ear		ө Heavy Rain		Yes	No	•
			e Steady Rain	_	Air Temperatur	re <b>§5</b> °F.	^ 7
			e Intermittent S	Showers		in past 24 hours	
j		(	Θ Clear/Sunny	_	30 % Cloud (		
P-Che	m: Temp (°			Saturation	pH (S.U.)_	Cond.	Grab
		Local Watersh		esaturation_	pri (5.0.)_	Cond	
Instream Wate	ershed						
Features:	3	Predominate St					
Stream Width:	<u>o</u>	ө Surface Mini	-	ө Construction		e Forest	
Range of Depth		ө Deep Mining		e Commercial		ө Pasture / Gra	zing
Average Veloci	ity:ft/s	θ Oil Wells		e Industrial		e Silviculture	
Discharge:	cfs	e Land Disposa	ıl	ө Row Crops		e Urban Runof	f / Storm Sewers
Est. Reach Len							
Hydraulic Struc			Stream Flow:			Stream Type:	
	ө Bridge Abutı	ments	e Dry	Pooled	e Low		() Intermittent
e Island	e Waterfalls	nomo	e Normal	e High	S DOM	e Ephemeral	o Seep
ł	e waterians		1			e chucineiai	o oech
θ Other			θ Very Rapid o			L	[0]
Riparian Veget		Dom. Tree / Sh	rub Taxa	Canopy Cover:			Channel Alterations:
Dominate Type				a Fully Expose	_		e Dredging
θ Trees	e Shrubs			e Partially Shad		4	Channelization
0 Grasses	θ Herbaceous			ө Partially Exp	osed (50-75%)		(e Full or e Partial)
Number of Stra	ıta			<ul><li>θ Fully Shaded</li></ul>	(75-100%)		
Substrate e Est	. ө Р.С.		Riffle	15_%	Run_	5_%	Pool <u><b>20</b></u> %
Silt / Clay (< 0.	.06 mm)						
Sand (0.06 - 2	mm)		15		15		15
Gravel (2 - 64 r			75		75		75
Cobble (64 - 25		***************************************	10		10		10
Boulders ( > 25			70				
Bedrock	o min)						
Habitat			<u> </u>	Condition	Category		
			Corbo		<del></del>		Poor
Parameter		timal		ptimal		ginal	
	Greater than 70%				20-40% mix of st		Less than 20% stable habitat, lack
		faunal colonization			habitat availabilit	•	of habitat is obvious; substrate
1. Epifaunal	and fish cover; ir	_	potential; adequa		destrable; substra disturbed or remo		unstable or lacking.
Substrate /	submerged lobs, cobble or other s		maintenance of p presence of addit	•	disturbed of reind	oved.	
Available	at stage to allow		the form of newfa				
Cover	potential (i.e., lo			nization (may rate			
			l		1		I
			at high end of sea	ne).			
	not new fall and		at high end of sea	ne).		_	
	not new fall and	not transient).			10 9	8 7 6	5 4 3 2 1
SCORE	not new fall and	not transient).	15 14	13 12 11	10 9	8 7 (6)	
	not new fall and  20 19  Mixture of substi	not transient).  18 17 16  rate materials, with	15 14 Mixture of soft sa	13 12 11 and, mud, or clay,	All mud or clay o	or sand bettom;	Hard-pan clay or bedrock; no root
SCORE	not new fall and  20 19  Mixture of substr	not transient).  18 17 16  rate materials, with and prevalent; root	15 14 Mixture of soft somud may be dom	13 12 11 and, mud, or clay; inant; some root	All mud or clay o		
	not new fall and  20 19  Mixture of substrated and firm s mats and submer	not transient).  18 17 16  rate materials, with and prevalent; root	15 14 Mixture of soft sa	13 12 11 and, mud, or clay; inant; some root	All mud or clay o	or sand bettom;	Hard-pan clay or bedrock; no root
SCORE  2. Pool Substrate	not new fall and  20 19  Mixture of substragravel and firm s mats and submer common.	not transient).  18 17 16  rate materials, with and prevalent; root	15 14 Mixture of soft somud may be dom mats and submer	13 12 11 and, mud, or clay; inant; some root	All mud or clay o	or sand bettom;	Hard-pan clay or bedrock; no root
SCORE  2. Pool Substrate Characterizat	not new fall and  20 19  Mixture of substragravel and firm s mats and submer common.	not transient).  18 17 16  rate materials, with and prevalent; root	15 14 Mixture of soft somud may be dom mats and submer	13 12 11 and, mud, or clay; inant; some root	All mud or clay o	or sand bettom;	Hard-pan clay or bedrock; no root
SCORE  2. Pool Substrate	not new fall and  20 19  Mixture of substragravel and firm s mats and submer common.	not transient).  18 17 16  rate materials, with and prevalent; root	15 14 Mixture of soft somud may be dom mats and submer	13 12 11 and, mud, or clay; inant; some root	All mud or clay o	or sand bettom;	Hard-pan clay or bedrock; no root
SCORE  2. Pool Substrate Characterizat	not new fall and  20 19  Mixture of substraction of substracti	not transient).  18 17 16  rate materials, with and prevalent; root ged vegetation	15 14 Mixture of soft st mud may be dom mats and submer present.	13 12 11 and, mud, or clay, inant; some root ged vegetation	All mud or clay of little or no root m vegetation.	or sand bettom;	Hard-pan clay or bedrock, no root mat or vegetation.
SCORE  2. Pool Substrate Characterizat	not new fall and  20 19  Mixture of substructure and firm s mats and submer common.	not transient).  18 17 16  rate materials, with and prevalent; root ged vegetation	15 14 Mixture of soft st mud may be dom mats and submer present.	13 12 11 and, mud, or clay; inant; some root ged vegetation	All mud or clay of little or no root m vegetation.	or sand bettom; nat; no submerged	Hard-pan clay or bedrock, no root mat or vegetation.
SCORE  2. Pool Substrate Characterizat	not new fall and  20 19  Mixture of substs gravel and firm s mats and submer common.	not transient).  18 17 16  rate materials, with and prevalent; root ged vegetation  18 17 16  e-shallow, large-	15 14  Mixture of soft st mud may be dom mats and submer present.	13 12 11 and, mud, or clay; inant; some root ged vegetation	All mud or clay of little or no root m vegetation.	or sand betom; nat; no submerged  8 7 6	Hard-pan clay or bedrock, no root mat or vegetation.  5 4 3 2 1  Majority of pools small-shallow or
SCORE  2. Pool Substrate Characterizat	not new fall and  20 19  Mixture of substructure and firm s mats and submer common.  20 19  Even mix of larg deep, small-shall	not transient).  18 17 16  rate materials, with and prevalent; root ged vegetation  18 17 16  e-shallow, large-	15 14 Mixture of soft st mud may be dom mats and submer present.	13 12 11 and, mud, or clay; iniant; some root ged vegetation	All mud or clay of little or no root m vegetation.	or sand betom; nat; no submerged  8 7 6	Hard-pan clay or bedrock, no root mat or vegetation.
SCORE  2. Pool Substrate Characterizat ion	not new fall and  20 19  Mixture of substs gravel and firm s mats and submer common.	not transient).  18 17 16  rate materials, with and prevalent; root ged vegetation  18 17 16  e-shallow, large-	15 14  Mixture of soft st mud may be dom mats and submer present.	13 12 11 and, mud, or clay; iniant; some root ged vegetation	All mud or clay of little or no root m vegetation.	or sand betom; nat; no submerged  8 7 6	Hard-pan clay or bedrock, no root mat or vegetation.  5 4 3 2 1  Majority of pools small-shallow or
2. Pool Substrate Characterization SCORE 3. Pool	not new fall and  20 19  Mixture of substructure and firm s mats and submer common.  20 19  Even mix of larg deep, small-shall	not transient).  18 17 16  rate materials, with and prevalent; root ged vegetation  18 17 16  e-shallow, large-	15 14  Mixture of soft st mud may be dom mats and submer present.	13 12 11 and, mud, or clay; iniant; some root ged vegetation	All mud or clay of little or no root m vegetation.	or sand betom; nat; no submerged  8 7 6	Hard-pan clay or bedrock, no root mat or vegetation.  5 4 3 2 1  Majority of pools small-shallow or
SCORE  2. Pool Substrate Characterizat ion  SCORE  3. Pool Variability	not new fall and  20 19  Mixture of substt gravel and firm s mats and submer common.  20 19  Even mix of larg deep, small-shall pools present.	not transient).  18 17 16  rate materials, with and prevalent; root ged vegetation  18 17 16  e-shallow, large-ow, small-deep	15 14  Mixture of soft st mud may be dom mats and submer present.  15 14  Majority of pool few shallow.	13 12 11 and, mud, or clay; iniant; some root ged vegetation	All mud or clay of little or no root m vegetation.	or sand betom; nat; no submerged  8 7 6	Hard-pan clay or bedrock, no root mat or vegetation.  5 4 3 2 1  Majority of pools small-shallow or
2. Pool Substrate Characterization SCORE  3. Pool Variability SCORE	not new fall and  20 19  Mixture of substt gravel and firm s mats and submer common.  20 19  Even mix of larg deep, small-shall pools present.	not transient).  18 17 16  rate materials, with and prevalent; root ged vegetation  18 17 16  e-shallow, large-	15 14  Mixture of soft st mud may be dom mats and submer present.  15 14  Majority of pool few shallow.	13 12 11 and, mud, or clay; inant; some root ged vegetation  13 12 11 large-deep; very	All mud or clay of little or no root m vegetation.  10 9  Shallow pools no prevalent than de	s 7 6 uch more pep pools.	Hard-pan clay or bedrock, no root mat or vegetation.  5 4 3 2 1  Majority of pools small-shallow or pools absent
2. Pool Substrate Characterization SCORE  3. Pool Variability	not new fall and  20 19  Mixture of substt gravel and firm s mats and submer common.  20 19  Even mix of larg deep, small-shall pools present.	not transient).  18 17 16  rate materials, with and prevalent; root ged vegetation  18 17 16  e-shallow, large-ow, small-deep	15 14  Mixture of soft st mud may be dom mats and submer present.  15 14  Majority of pool few shallow.	13 12 11 and, mud, or clay; inant; some root ged vegetation  13 12 11 large-deep; very	All mud or clay of little or no root m vegetation.  10 9  Shallow pools no prevalent than de	s 7 6 uch more pep pools.	Hard-pan clay or bedrock, no root mat or vegetation.  5 4 3 2 1  Majority of pools small-shallow or pools absent
SCORE  2. Pool Substrate Characterization  SCORE  3. Pool Variability  SCORE	not new fall and  20 19  Mixture of substt gravel and firm s mats and submer common.  20 19  Even mix of larg deep, small-shall pools present.	not transient).  18 17 16  rate materials, with and prevalent; root ged vegetation  18 17 16  e-shallow, large-ow, small-deep	15 14  Mixture of soft st mud may be dom mats and submer present.  15 14  Majority of pool few shallow.	13 12 11 and, mud, or clay; inant; some root ged vegetation  13 12 11 large-deep; very	All mud or clay of little or no root m vegetation.  10 9  Shallow pools no prevalent than de	s 7 6 uch more pep pools.	Hard-pan clay or bedrock, no root mat or vegetation.  5 4 3 2 1  Majority of pools small-shallow or pools absent
2. Pool Substrate Characterization SCORE  3. Pool Variability SCORE	not new fall and  20 19  Mixture of substt gravel and firm s mats and submer common.  20 19  Even mix of larg deep, small-shall pools present.	not transient).  18 17 16  rate materials, with and prevalent; root ged vegetation  18 17 16  e-shallow, large-ow, small-deep	15 14  Mixture of soft st mud may be dom mats and submer present.  15 14  Majority of pool few shallow.	13 12 11 and, mud, or clay; inant; some root ged vegetation  13 12 11 large-deep; very	All mud or clay of little or no root m vegetation.  10 9  Shallow pools no prevalent than de	s 7 6 uch more pep pools.	Hard-pan clay or bedrock, no root mat or vegetation.  5 4 3 2 1  Majority of pools small-shallow or pools absent
2. Pool Substrate Characterization SCORE  3. Pool Variability SCORE	not new fall and  20 19  Mixture of substt gravel and firm s mats and submer common.  20 19  Even mix of larg deep, small-shall pools present.	not transient).  18 17 16  rate materials, with and prevalent; root ged vegetation  18 17 16  e-shallow, large-ow, small-deep	15 14  Mixture of soft st mud may be dom mats and submer present.  15 14  Majority of pool few shallow.	13 12 11 and, mud, or clay; inant; some root ged vegetation  13 12 11 large-deep; very	All mud or clay of little or no root m vegetation.  10 9  Shallow pools no prevalent than de	s 7 6 uch more pep pools.	Hard-pan clay or bedrock, no root mat or vegetation.  5 4 3 2 1  Majority of pools small-shallow or pools absent

	Little or no enlargement of islands	Some new increase in bar	Moderate deposition of new gravel,	Heavy deposits of tine material,
1	or point bars and less than 5%	formation, mostly from gravel,	sand or fine sediment on old and	increased bar development; more
i	(<20% for low-gradient streams) of	sand, or fine sediment; 5-30% (20-	new bars; 30-50% (50-80% for low	than 50% (80% for low-gradient)
4. Sediment	the bottom affected by sediment	50% for low-gradient) of the	gradient) of the bottom affected;	of the bottom changing frequently
Deposition	deposition.	bottom affected; slight deposition	sediment deposits at obstructions,	pools almost absent due to
Беролион		in pools.	constrictions, and bends, moderate	substantial sediment deposition.
	]		deposition of pools prevalent.	·
			1 ' '	
ocopr	20 10 10 17 16	15 14 12 12 11		
SCORE	20 19 18 17 16	15 14 13 12 11	(10)9876	5 4 3 2 1
5. Channel	Water reaches base of both lower	Water fills >75% of the available	Water fills 25-75% of the available	Very little water in channel and
ł	banks, and minimal amount of	channel; or <25% of channel	channel, and/or riffle substrates are	mostly present as standing pools.
Flow Status	channel substrate is exposed	substrate is exposed.	mostly exposed.	
CCODE:	20 10 19 17 16	15 14 12 12 11	10 (9) 8 7 6	
SCORE	20 19 18 17 16	15 14 13 12 11	<u> </u>	5 4 3 2 1
	Channelization or dredging absent	Some channelization present,	Channelization may be extensive;	Banks shored with gabion or
	or minimal; stream with normal	usually in areas of bridge	embankments or shoring structures	cement; over 80% of the stream
6. Channel	pattern.	abutments; evidence of past	present on both banks; and 40-80%	reach channelized and disrupted.
Alteration		channelization, i.e., dredging,	of stream reach channelized and	Instream habitat greatly altered or
A COLUMNION	1	(greater than past 20 years) may be	disrupted.	removed entirely.
		present, but recent channelization		
		is not present.		
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2/1
	The bends in the stream increase	The bends in the stream increase	The bends in the stream increase	Channel straight; waterway has
1	the stream length 3 to 4 times	the stream length 1 to 2 times	the stream length 1 to 2 times	been channelized for a long
	longer than if it was in a straight	longer than if it was in a straight	longer than if it was in a straight	distance.
	line. (Note-channel braiding is	line.	line.	distance.
7. Channel	considered normal in coastal plains	ļ		
Sinuosity	and other low-lying areas. This			
ľ	parameter is not easily rated in			
	these areas.			
	these areas.			
	<u> </u>			
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 //1
8. Bank	Banks stable, evidence of erosion	Moderately stable; infrequent,	Moderatly unstable; 30-60% of	Unstable; many eroded acces;
	or bank failure absent or minimal;	small areas of erosion mostly	bank in reach has areas of erosion;	"raw" areas frequent along straight
Stability	little potential for future problems.	healed over. 5-30% of bank in	high erosion potential during	sections and bends; obvious bank
(score each	<5% of bank affected.	reach has areas of erosion.	floods.	sloughing; 60-100% of bank has
bank)				erosional scars.
Note: determine	ľ			
left or right side				
by facing				
downstream	_			
SCORE	Left Bank 10 /9	8 7 6	5 4 3	2 1 0
(LB)	l bon bank 10 U.	, ,	,	2 , 0
SCORE _	Right Bank 10 /9	8 7 6	5 4 3	2 1 0
(RB)				2 ' 0
\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	More than 90% of the streambank	70-90% of the streambank	50-70% of the streambank	Less than 50% of the streambank
	surfaces and immediate riparian	surfaces covered by native	surfaces covered by vegetation;	surfaces covered by vegetation;
	zone covered by native vegetation,	vegetation, but one class of plants	disruption obvious; patches of bare	
9. Vegetative	including shrubs, or nonwoody	is not well represented; disruption	soil or closely cropped vegetation	vegetation is very high; vegetation
Protection	macrophytes; vegeative disruption	evident but not affecting full plant	common; less than one half of the	has been removed to 5 cm or less
(score each	, , , , , , , , , , , , , , , , , , , ,		1	in stubble height.
bank)	through grazing or mowing minimal or not evident; almost all plants	growth potential to any great extent; more than one half of the	potential plant stubble height remaining.	ni studdie neight.
,	allowed to grow naturally.	potential plant stubble height	romaning.	
	anowed to grow naturally.	remaining.		
2222		<u> </u>		
SCORE	Left Bank 10 9	8 7 6	5 4 3	$\binom{2}{1}$ $\binom{1}{0}$
(LB)	Distance 1000	9 7 /	ļ	
SCORE	Right Bank 10 9	8 7 6	5 4 3	$\binom{2}{1}$ 1 0
(RB)	ļ		<u> </u>	
	Width of riparian zone >18 meters,	Width of riparian zone 12-18	Width of riparian zone 6-12	Width of riparian zone <6 meters;
	human activities (i.e., parking lots,	meters; human activites have	meters, human activities have	little or no riparian vegetation due
	roadbeds, clear-cuts, lawns, or	impacted zone only minimally.	impacted zone a great deal.	to human activity.
10. Riparian	crops) have not impacted zone.			
Vegetative				
Zone Width			1	
(score each				
bank riparian				
zone)				
SCORE	Left Bank 10 9	8 7 6	5 4 3	2 1 0
(LB)			<u> </u>	L \{ \( \)
SCORE	Right Bank 10 9	8 7 6	5 4 3	2 (1) 0
		İ	i '	
(RB)				

Stream Name:	Lower	Howards	Creak		Location: W	MU	5,C,-07
Station #: 50	0+00	Mile:			Basin/Watersh	ed: LHC	
LAT.:		LONG.:			County: Cla	irk USGS 7	.5 TOPO:
Date: 7/28	08 Time:	AM	PM		Investigators:	4 + =	22
		Type Sam	ple: P-Chem	Macroinvert	ebrate Fish	Bacteria	
Weather:		Now	Past 24 hours		Has there been	heavy rain in la	st 7 days?
			θ Heavy Rain		Yes No		
			$\theta \; Steady \; Rain$		Air Temperatu	re°F.	
			θ Intermittent	Showers	Inches rainfall	in past 24 hours	i in
			Clear/Sunny	>	30% Cloud	Cover.	
P-Che	em: Temp (°C	C) D.O.	(mg/l)	'Saturation	pH (S.U.)_	Cond	Grab
Instream Wate	ershed	Local Waters	ned Features:				
Features:	- 1	Predominate Si	urrounding Lan-	d Use:			
Stream Width:	: <u>5</u> ө Surface Min		ng e Construction		e Forest		
Range of Depth			e Commercial		e Pasture / Graz		zing
Average Velocity:ft/s		e Industrial		e Silviculture			
Discharge: cfs e Land Dispose		al e Row Crops		Θ Urban Runoff		f / Storm Sewers	
Est. Reach Len	igth:						
Hydraulic Strue			Stream Flow:	-		Stream Type:	
e Dams	ө Bridge Abutı	ments	e Dry	(9 Pooled)	e Low	θ Perennial	θ Intermittent
e Island	θ Waterfalls		e Normal e High		e Ephemeral		о Ѕеер
o Other			e Very Rapid (				· ·==r
Riparian Veget	tation:	Dom. Tree / Sh		Canopy Cover:		·	Channel Alterations:
Dominate Type		Dom. 1100 / 311	iso iua	e Fully Expose			Θ Dredging
	Θ Shrubs				ded (25-50%)		e Channelization
	o Herbaceous	_		,	,		(e Full or e Partial)
Number of Stra		ر	e Partially Expo				(orun or or artial)
			Dien.	θ Fully Shaded		74 0/	Deal 2// 9/
Substrate e Est		· · · · · · · · · · · · · · · · · · ·	Killie_	<u>33_</u> %	Run	<u>33 %</u>	Pool <u>34</u> %
Silt / Clay (< 0							
Sand (0.06 - 2			20		70 40		20
Gravel (2 - 64 :			40		40		40
Cobble (64 - 25			40		70		40
Boulders ( > 25 Bedrock	36 mm)						
ļ	T			Condition	Category		
Habitat	On	timal	Subo			minal	Poor
Parameter	<u> </u>	timal	Suboptimal		Marginal		Less than 20% stable habitat; lack
	Greater than 70%		40-70% mix of stable habitat; well-		1		of habitat is obvious; substrate
	and fish cover; m		suited for full colonization potential; adequate habitat for		desirable, substrate frequently		unstable or lacking.
1. Epifaunal	submerged lobs,	_	maintenance of p		disturbed or remo		g
Substrate /	cobble or other s	-	presence of additional substrate in				
Available	at stage to allow	full colonication	the form of newfall, but not yet				
Cover	potential (i.e., lo		prepared for colonization (may rate		]		
I	not new fall and	not transient).	at high end of sca	ale).			
1	1						
SCORE		18 17 16		13 12 11	/10/9	8 7 6	5 4 3 2 1
1		rate materials, with			All mud or clay o		Hard-pan clay or bedrock; no root
2. Pool		and prevalent; root			1	nat; no submerged	mat or vegetation.
Substrate	mats and submer common.	ged vegetation	mats and submer present.	geu vegetation	vegetation.		1
Characterizat			prosent.				
ion							
[			{			_	
ecope —	20 19	18 17 16	15 14	13 12 11	10 9 /	$\frac{6}{8}$ 7 6	5 4 3 2 1
SCORE					Shallow pools in	_/	Majority of pools small-shallow or
1	Even mix of larg		few shallow.	large-deep; very	prevalent than de		pools absent
3. Pool	pools present.	ом, анан-исср	Jiew shanow.		Free Lion than th		[
Variability	1,0000 1,000						
1	1					$\triangle$	
L			15 14	13 12 11	10 9	8 7 /6	5 4 3 2 1
SCORE	20 19	18 17 16	13 14				
SCORE	<del></del>	18 17 16	13 14		<u></u>		
70.70	<del></del>	18 17 16	13 14	•	<u></u>		
70.70	<del></del>	18 17 16	13 14		the second second		
20.70	<del></del>	18 17 16	13 14				
	<del></del>	18 17 16	13 14				

		lo · · · ·		
	Little or no enlargement of islands	Some new increase in bar	Moderate deposition of new gravel,	
	or point bars and less than 5%	formation, mostly from gravel,	sand or fine sediment on old and	increased bar development; more
Ī	(<20% for low-gradient streams) of	, , ,	new bars; 30-50% (50-80% for low	
4. Sediment	the bottom affected by sediment	50% for low-gradient) of the	gradient) of the bottom affected;	of the bottom changing frequently'
Deposition	deposition.	bottom affected; slight deposition	sediment deposits at obstructions,	pools almost absent due to
		in pools.	constrictions, and bends; moderate	substantial sediment deposition.
			deposition of pools prevalent.	
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
5. Channel	Water reaches base of both lower	Water fills >75% of the available	Water fills 25-75% of the available	Very little water in channel and
Flow Status	banks, and minimal amount of	channel; or <25% of channel	channel, and/or riffle substrates are	mostly present as standing pools.
Flow Status	channel substrate is exposed	substrate is exposed.	mostly exposed.	
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
	Channelization or dredging absent	Some channelization present,	Channelization may be extensive;	Banks shored with gabion or
	or minimal; stream with normal	usually in areas of bridge	embankments or shoring structures	cement; over 80% of the stream
6. Channel	pattern.	abutments; evidence of past	present on both banks; and 40-80%	
		channelization, i.e., dredging,	of stream reach channelized and	Instream habitat greatly altered or
Alteration		(greater than past 20 years) may be		removed entirely.
		present, but recent channelization	·	,
		is not present.		
SCORE	20 19 18 17 16	15 14 13 12 11	10) 9 8 7 6	5 4 3 2 1
	The bends in the stream increase	The bends in the stream increase	The bends in the stream increase	Channel straight; waterway has
	the stream length 3 to 4 times	the stream length 1 to 2 times	the stream length 1 to 2 times	been channelized for a long
ł	longer than if it was in a straight	longer than if it was in a straight	longer than if it was in a straight	distance.
	line. (Note-channel braiding is	line.	line.	distance.
7. Channel	considered normal in coastal plains			
Sinuosity	and other low-lying areas. This			
	parameter is not easily rated in			į.
	these areas.		1	·
SCORE	20 19 18 17 16	15 14 13 12 11	$\frac{7}{10}$ 9 8 7 6	5 4 3 2 1
SCORE	Banks stable; evidence of erosion			
8. Bank	or bank failure absent or minimal;	Moderately stable; infrequent, small areas of erosion mostly	Moderatly unstable; 30-60% of bank in reach has areas of erosion;	Unstable; many eroded areas;
Stability	little potential for future problems.	healed over, 5-30% of bank in	high erosion potential during	"raw" areas frequent along straight sections and bends; obvious bank
	indic potential for tuture problems.	ilicaled over. 3-30 % of bank in	Ingh crosion potential during	sections and bends, obvious bank
uscore each	<5% of book offeeted	reach has areas of erosion	floods	cloughing: 60, 1009/, of book has
(score each bank)	<5% of bank affected.	reach has areas of erosion.	floods.	sloughing; 60-100% of bank has
bank)	<5% of bank affected.	reach has areas of erosion.	floods.	sloughing; 60-100% of bank has erosional scars.
bank) Note: determine	<5% of bank affected.	reach has areas of erosion.	floods.	
bank) Note: determine left or right side	<5% of bank affected.	reach has areas of erosion.	floods.	
bank) Note: determine left or right side by facing	<5% of bank affected.	reach has areas of erosion.	floods.	
bank) Note: determine left or right side by facing downstream				erosional scars.
bank) Note: determine left or right side by facing downstream SCORE	<5% of bank affected.  Left Bank 10 9	reach has areas of erosion.	floods.	
bank) Note: determine left or right side by facing downstream SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	erosional scars.
bank) Note: determine left or right side by facing downstream SCORE(LB) SCORE				erosional scars.
bank) Note: determine left or right side by facing downstream SCORE (LB)	Left Bank 10 9 Right Bank 10 9	8 7 6 8 7 6	5 4 3	2 I 0
bank) Note: determine left or right side by facing downstream SCORE(LB) SCORE	Left Bank 10 9  Right Bank 10 9  More than 90% of the streambank	8 7 6 8 7 6	5 4 3 5 4 3	erosional scars.  2 1 0  2 1 0  Less than 50% of the streambank
bank)  Note: determine left or right side by facing downstream  SCORE(LB)  SCORE(RB)	Left Bank 10 9  Right Bank 10 9  More than 90% of the streambank surfaces and immediate riparian	8 7 6 8 7 6 70-90% of the streambank surfaces covered by native	5 4 3 5 4 3 50-70% of the streambank surfaces covered by vegetation;	erosional scars.  2 I 0  2 I 0  Less than 50% of the streambank surfaces covered by vegetation;
bank) Note: determine left or right side by facing downstream SCORE(LB) SCORE(RB).	Left Bank 10 9  Right Bank 10 9  More than 90% of the streambank	8 7 6 8 7 6	5 4 3 5 4 3 50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare	erosional scars.  2 1 0  2 1 0  Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank
bank)  Note: determine left or right side by facing downstream  SCORE(LB)  SCORE(RB)  9. Vegetative Protection	Left Bank 10 9  Right Bank 10 9  More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation,	8 7 6 8 7 6 70-90% of the streambank surfaces covered by native vegetation, but one class of plants	5 4 3 5 4 3 50-70% of the streambank surfaces covered by vegetation;	erosional scars.  2 I 0  2 I 0  Less than 50% of the streambank surfaces covered by vegetation;
bank)  Note: determine left or right side by facing downstream SCORE (LB)  SCORE (RB)  9. Vegetative Protection (score each	Left Bank 10 9  Right Bank 10 9  More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including shrubs, or nonwoody	8 7 6 8 7 6 70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented; disruption evident but not affecting full plant	5 4 3 5 4 3 50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation	erosional scars.  2 1 0  2 1 0  Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation
bank)  Note: determine left or right side by facing downstream  SCORE(LB)  SCORE(RB)  9. Vegetative Protection	Left Bank 10 9  Right Bank 10 9  More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including shrubs, or nonwoody macrophytes; vegeative disruption	8 7 6 8 7 6 70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented; disruption evident but not affecting full plant	5 4 3  50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one half of the	2 1 0  2 1 0  Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 cm or less
bank)  Note: determine left or right side by facing downstream SCORE (LB)  SCORE (RB)  9. Vegetative Protection (score each	Left Bank 10 9  Right Bank 10 9  More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including shrubs, or nonwoody macrophytes; vegeative disruption through grazing or mowing minimal	8 7 6  8 7 6  70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented; disruption evident but not affecting full plant growth potential to any great	5 4 3  50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one half of the potential plant stubble height	2 1 0  2 1 0  Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 cm or less
bank) Note: determine left or right side by facing downstream SCORE	Left Bank 10 9  Right Bank 10 9  More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including shrubs, or nonwoody macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants	8 7 6  8 7 6  70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented; disruption evident but not affecting full plant growth potential to any great extent; more than one half of the	5 4 3  50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one half of the potential plant stubble height	2 1 0  2 1 0  Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 cm or less
bank)  Note: determine left or right side by facing downstream SCORE (LB)  SCORE (RB)  9. Vegetative Protection (score each	Left Bank 10 9  Right Bank 10 9  More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including shrubs, or nonwoody macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants	8 7 6  8 7 6  70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented; disruption evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height	5 4 3  50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one half of the potential plant stubble height	2 1 0  2 1 0  Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 cm or less
bank) Note: determine left or right side by facing downstream SCORE(LB) SCORE(RB)  9. Vegetative Protection (score each bank)  SCORE(LB)	Left Bank 10 9  Right Bank 10 9  More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including shrubs, or nonwoody macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	8 7 6  8 7 6  70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented; disruption evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height remaining	5 4 3  50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one half of the potential plant stubble height remaining.	2 1 0  2 1 0  Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 cm or less in stubble height.
bank)  Note: determine left or right side by facing downstream  SCORE	Left Bank 10 9  Right Bank 10 9  More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including shrubs, or nonwoody macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	8 7 6  8 7 6  70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented; disruption evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height remaining	5 4 3  50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one half of the potential plant stubble height remaining.	2 1 0  2 1 0  Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 cm or less in stubble height.
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bank) Note: determine left or right side by facing downstream SCORE(LB) SCORE(RB)  9. Vegetative Protection (score each bank)  SCORE(LB) SCORE(RB)	Left Bank 10 9  Right Bank 10 9  More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including shrubs, or nonwoody macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9  Width of riparian zone >18 meters; human activities (i.e., parking lots,	8 7 6  8 7 6  70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented; disruption evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height remaining  8 7 6  Width of riparian zone 12-18 meters; human activites have	5 4 3  50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one half of the potential plant stubble height remaining.  5 4 3  Width of riparian zone 6-12 meters; human activities have	erosional scars.  2 1 0  2 1 0  Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 cm or less in stubble height.  2 1 0  2 1 0  Width of riparian zone <6 meters; little or no riparian vegetation due
bank) Note: determine left or right side by facing downstream SCORE(LB) SCORE(RB)  9. Vegetative Protection (score each bank)  SCORE(LB) SCORE(RB)  10. Riparian	Left Bank 10 9  Right Bank 10 9  More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including shrubs, or nonwoody macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9  Width of riparian zone >18 meters, human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or	8 7 6  8 7 6  70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented; disruption evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height remaining  8 7 6  Width of riparian zone 12-18 meters; human activites have	5 4 3  50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one half of the potential plant stubble height remaining.  5 4 3  Width of riparian zone 6-12 meters; human activities have	erosional scars.  2 1 0  2 1 0  Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 cm or less in stubble height.  2 1 0  2 1 0  Width of riparian zone <6 meters; little or no riparian vegetation due
bank) Note: determine left or right side by facing downstream SCORE(LB) SCORE(RB)  9. Vegetative Protection (score each bank)  SCORE(LB) SCORE(RB)  10. Riparian Vegetative	Left Bank 10 9  Right Bank 10 9  More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including shrubs, or nonwoody macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9  Width of riparian zone >18 meters, human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or	8 7 6  8 7 6  70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented; disruption evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height remaining  8 7 6  Width of riparian zone 12-18 meters; human activites have	5 4 3  50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one half of the potential plant stubble height remaining.  5 4 3  Width of riparian zone 6-12 meters; human activities have	erosional scars.  2 1 0  2 1 0  Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 cm or less in stubble height.  2 1 0  2 1 0  Width of riparian zone <6 meters; little or no riparian vegetation due
bank) Note: determine left or right side by facing downstream SCORE(LB) SCORE(RB)  9. Vegetative Protection (score each bank)  SCORE(LB) SCORE(LB) SCORE(LB) SCORE(LB) SCORE(LB) SCORE(RB)	Left Bank 10 9  Right Bank 10 9  More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including shrubs, or nonwoody macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9  Width of riparian zone >18 meters, human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or	8 7 6  8 7 6  70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented; disruption evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height remaining  8 7 6  Width of riparian zone 12-18 meters; human activites have	5 4 3  50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one half of the potential plant stubble height remaining.  5 4 3  Width of riparian zone 6-12 meters; human activities have	erosional scars.  2 1 0  2 1 0  Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 cm or less in stubble height.  2 1 0  2 1 0  Width of riparian zone <6 meters; little or no riparian vegetation due
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bank) Note: determine left or right side by facing downstream SCORE(LB) SCORE(RB)  9. Vegetative Protection (score each bank)  SCORE(LB) SCORE(LB) SCORE(LB) SCORE(LB) SCORE(LB) SCORE(RB)	Left Bank 10 9  Right Bank 10 9  More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including shrubs, or nonwoody macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9  Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	8 7 6  8 7 6  70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented; disruption evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height remaining  8 7 6  Width of riparian zone 12-18 meters; human activites have	5 4 3  50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one half of the potential plant stubble height remaining.  5 4 3  Width of riparian zone 6-12 meters; human activities have	erosional scars.  2 1 0  2 1 0  Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 cm or less in stubble height.  2 1 0  2 1 0  Width of riparian zone <6 meters; little or no riparian vegetation due
bank) Note: determine left or right side by facing downstream SCORE(LB) SCORE(RB)  9. Vegetative Protection (score each bank)  SCORE(LB) SCORE(LB) SCORE(RB)  10. Riparian Vegetative Zone Width (score each bank riparian zone)	Left Bank 10 9  Right Bank 10 9  More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including shrubs, or nonwoody macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9  Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	8 7 6  70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented; disruption evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height remaining  8 7 6  Width of riparian zone 12-18 meters; human activites have impacted zone only minimally.	5 4 3  50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one half of the potential plant stubble height remaining.  5 4 3  Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	2 1 0  2 1 0  Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 cm or less in stubble height.  2 1 0  2 1 0  Width of riparian zone <6 meters; little or no riparian vegetation due to human activity.
bank) Note: determine left or right side by facing downstream SCORE(LB) SCORE(RB)  9. Vegetative Protection (score each bank)  SCORE(RB)  10. Riparian Vegetative Zone Width (score each bank riparian zone) SCORE	Left Bank 10 9  Right Bank 10 9  More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including shrubs, or nonwoody macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9  Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	8 7 6  8 7 6  70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented; disruption evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height remaining  8 7 6  Width of riparian zone 12-18 meters; human activites have	5 4 3  50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one half of the potential plant stubble height remaining.  5 4 3  Width of riparian zone 6-12 meters; human activities have	erosional scars.  2 1 0  2 1 0  Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 cm or less in stubble height.  2 1 0  2 1 0  Width of riparian zone <6 meters; little or no riparian vegetation due
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#### Low Gradient Stream Data Sheet

Stream Name:	Lower	Housedo	creek		Location: /	טמט 3	5.C 08
Station #: Z1	100	Mile:			Basin/Watersh		Howards Creek
LAT.:		LONG.:	-		County: Clo	rk USGS 7	.5 TOPO:
Date: 7/28/	08 Time:	AM	PM		Investigators:	TH + 2	2
<del></del>		Type Sam	ple: P-Chem	Macroinver	tebrate Fish	Bacteria	
Weather:	10	Now	Past 24 hours			heavy rain in la	st 7 days?
1	lear		θ Heavy Rain	(	Yes	No	•
Ì			e Steady Rain		Air Temperatu	re <b>75</b> °F.	
Į.			e Intermittent	Showers		in past 24 hours	- <b>2</b> in
1			6 Clear/Sunny	5	20 % Cloud	-	Anadata-pana
P-Che	em: Temp (°			6Saturation	pH (S.U.)	Cond.	Grab
Instream Wat		Local Waters	<u>`                                    </u>	ooutoration_			
Features:			urrounding Lan	d lise			
	8-12'					I. r	
Stream Width:	0-12	e Surface Mini	-	e Construction		e Forest	
Range of Depti	h:	e Deep Mining	<u> </u>	e Commercial		e Pasture / Gra	zing
Average Veloc		e Oil Wells		e Industrial		θ Silviculture	
Discharge:	cfs	ө Land Dispos	al	ө Row Crops		e Urban Runof	f / Storm Sewers
Est. Reach Len	ngth:	<u> </u>				<u> </u>	
Hydraulic Stru	ctures:		Stream Flow:			Stream Type:	
e Dams	e Bridge Abut	ments	e Dry 🕜	θ Pooled)	e Low	ө Perennial	Intermitten
e Island	e Waterfalls		e Normal	θ High		e Ephemeral	θ Seep
e Other			e Very Rapid o	•		I .	•
Riparian Vege	tation	Dom. Tree / Sh		Canopy Cover:		L	Channel Alterations:
Dominate Type		Dom. Tice / Sil	1140 1474	e Fully Expose	=		o Dredging
					•		
	θ Shrubs			e Partially Sha			e Channelization
1 (	o Herbaceous				osed (50-75%)		(e Full or e Partial)
Number of Stra				Fully Shaded			
Substrate e Est			Riffle_	30 %	Run_	10%	Pool <u>60 %</u>
Silt / Clay (< 0	.06 mm)						
Sand (0.06 - 2	mm)						
Gravel (2 - 64	mm)		50	3	52	)	50
Cobble (64 - 2	56 mm)		50		50	)	<i>50</i>
Boulders ( > 2:	56 mm)						
Boulders ( > 2: Bedrock	56 mm)						
	56 mm)			Condition	Category		
Bedrock Habitat		timal	Subo		Category Mai	ginal	Poor
Bedrock	Ор	timal		ptimal	Mai	rginal	Poor Less than 2004 stable babitat: lask
Bedrock Habitat	Op Greater than 70%	6 of substrate	40-70% mix of st	ptimal able habitat; well-	<b>Mai</b> 20-40% mix of s	table habitat;	Less than 20% stable habitat; lack
Bedrock Habitat Parameter	Op Greater than 70% favorable for epit	6 of substrate faunal colonization	40-70% mix of st suited for full col-	ptimal able habitat; well- onization	Mai 20-40% mix of si habitat availabilit	table habitat; by less then	Less than 20% stable habitat; lack of habitat is obvious; substrate
Bedrock Habitat Parameter  1. Epifaunal	Op Greater than 70% favorable for epit and fish cover; m	6 of substrate faunal colonization nix of snags,	40-70% mix of st	ptimal able habitat; well- onization te habitat for	<b>Mai</b> 20-40% mix of s	table habitat; ty less then ate frequently	Less than 20% stable habitat; lack
Bedrock Habitat Parameter  1. Epifaunal Substrate /	Op Greater than 70% favorable for epit	6 of substrate faunal colonization ix of snags, undercut banks,	40-70% mix of st suited for full col- potential; adequa	ptimal  able habitat; well- onization te habitat for opulations;	Mai 20-40% mix of si habitat availabilit desirable; substra	table habitat; ty less then ate frequently	Less than 20% stable habitat; lack of habitat is obvious; substrate
Bedrock Habitat Parameter  1. Epifaunal	Ope Greater than 70% favorable for epit and fish cover; m submerged lobs,	6 of substrate faunal colonization nix of snags, undercut banks, table habitat and	40-70% mix of st suited for full col- potential; adequa maintenance of p	ptimal  able habitat; well- onization te habitat for opulations; ional substrate in	Mai 20-40% mix of si habitat availabilit desirable; substra	table habitat; ty less then ate frequently	Less than 20% stable habitat; lack of habitat is obvious; substrate
Bedrock Habitat Parameter  1. Epifaunal Substrate /	Greater than 70% favorable for epit and fish cover; m submerged lobs, cobble or other stat stage to allow potential (i.e., log	6 of substrate faunal colonization nix of snags, undercut banks, table habitat and full colonication gs/snags that are	40-70% mix of st suited for full col- potential; adequa maintenance of p presence of addit the form of newfa	ptimal  able habitat; well- onization te habitat for opulations; ional substrate in	Mai 20-40% mix of si habitat availabilit desirable; substra disturbed or remo	table habitat; ty less then ate frequently	Less than 20% stable habitat; lack of habitat is obvious; substrate
Bedrock Habitat Parameter  I. Epifaunal Substrate / Available	Greater than 70% favorable for epit and fish cover; m submerged lobs, cobble or other st at stage to allow	6 of substrate faunal colonization nix of snags, undercut banks, table habitat and full colonication gs/snags that are	40-70% mix of st suited for full col- potential; adequa maintenance of p presence of addit the form of newfa	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate	Mai 20-40% mix of si habitat availabilit desirable; substra disturbed or remo	table habitat; ty less then ate frequently	Less than 20% stable habitat; lack of habitat is obvious; substrate
Bedrock Habitat Parameter  I. Epifaunal Substrate / Available	Greater than 70% favorable for epit and fish cover; m submerged lobs, cobble or other stat stage to allow potential (i.e., log	6 of substrate faunal colonization nix of snags, undercut banks, table habitat and full colonication gs/snags that are	40-70% mix of st suited for full col- potential; adequa maintenance of p presence of addit the form of newfa prepared for colo	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate	Mai 20-40% mix of si habitat availabilit desirable; substra disturbed or remo	table habitat; ty less then ate frequently	Less than 20% stable habitat; lack of habitat is obvious; substrate
Bedrock Habitat Parameter  I. Epifaunal Substrate / Available	Greater than 70% favorable for epit and fish cover; m submerged lobs, cobble or other st at stage to allow potential (i.e., log not new fall and st	6 of substrate faunal colonization nix of snags, undercut banks, table habitat and full colonication gs/snags that are	40-70% mix of st suited for full col- potential; adequa maintenance of p- presence of addit the form of newfa prepared for colo at high end of sca	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate	Mai 20-40% mix of si habitat availabilit desirable; substra disturbed or remo	table habitat; ty less then ate frequently	Less than 20% stable habitat; lack of habitat is obvious; substrate
Bedrock Habitat Parameter  I. Epifaunal Substrate / Available Cover	Greater than 70% favorable for epit and fish cover; m submerged lobs, cobble or other sat stage to allow potential (i.e., lognot new fall and sat 1997).	6 of substrate faunal colonization nix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).	40-70% mix of st suited for full col- potential; adequa maintenance of p- presence of addit the form of newfa prepared for colo at high end of sca	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate alle).	Mai 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	table habitat; ty less then the frequently eved.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root
Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover	Greater than 70% favorable for epit and fish cover; m submerged lobs, cobble or other stat stage to allow potential (i.e., log not new fall and to the stage to allow potential file.)	6 of substrate faunal colonization nix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sea 15 //14 Mixture of soft sa mud may be dom	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 11 and, mud, or clay; inant; some root	Mai 20-40% mix of st habitat availabilit desirable; substradisturbed or removal to the sturbed of the sturbed o	table habitat; ty less then the frequently eved.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool	Greater than 70% favorable for epit and fish cover; m submerged lobs, cobble or other stat stage to allow potential (i.e., lognot new fall and to the stage to allow potential (i.e., lognot new fall and to the stage to allow potential (i.e., lognot new fall and to the stage to allow potential (i.e., lognot new fall and to the stage to allow potential (i.e., lognot new fall and to the stage to	6 of substrate faunal colonization nix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sea 15 // 14 // Mixture of soft sa mud may be dom mats and submerging the suited for the suited for the submerging for formal submerging for form	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 11 and, mud, or clay; inant; some root	Mai 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	table habitat; ty less then the frequently oved.  8 7 6 or sand bottom;	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root
Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate	Greater than 70% favorable for epit and fish cover; m submerged lobs, cobble or other stat stage to allow potential (i.e., log not new fall and to the stage to allow potential fine stage	6 of substrate faunal colonization nix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sea 15 //14 Mixture of soft sa mud may be dom	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 11 and, mud, or clay; inant; some root	Mai 20-40% mix of st habitat availabilit desirable; substradisturbed or removal to the sturbed of the sturbed o	table habitat; ty less then the frequently oved.  8 7 6 or sand bottom;	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root
Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterizat	Greater than 70% favorable for epit and fish cover; m submerged lobs, cobble or other stat stage to allow potential (i.e., log not new fall and to the stage to allow potential fine stage	6 of substrate faunal colonization nix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sea 15 // 14 // Mixture of soft sa mud may be dom mats and submerging the suited for the suited for the submerging for formal submerging for form	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 11 and, mud, or clay; inant; some root	Mai 20-40% mix of st habitat availabilit desirable; substradisturbed or removal to the sturbed of the sturbed o	table habitat; ty less then the frequently oved.  8 7 6 or sand bottom;	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root
Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate	Greater than 70% favorable for epit and fish cover; m submerged lobs, cobble or other stat stage to allow potential (i.e., log not new fall and to the stage to allow potential fine stage	6 of substrate faunal colonization nix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sea 15 // 14 // Mixture of soft sa mud may be dom mats and submerging the suited for the suited for the submerging for formal submerging for form	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 11 and, mud, or clay; inant; some root	Mai 20-40% mix of st habitat availabilit desirable; substradisturbed or removal to the sturbed of the sturbed o	table habitat; ty less then the frequently oved.  8 7 6 or sand bottom;	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root
Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterizat	Greater than 70% favorable for epit and fish cover; m submerged lobs, cobble or other stat stage to allow potential (i.e., log not new fall and to the stage to allow potential fine stage	6 of substrate faunal colonization nix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sea 15 // 14 // Mixture of soft sa mud may be dom mats and submerging the suited for the suited for the submerging for formal submerging for form	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 11 and, mud, or clay; inant; some root	Mai 20-40% mix of st habitat availabilit desirable; substradisturbed or removal to the sturbed of the sturbed o	table habitat; ty less then the frequently oved.  8 7 6 or sand bottom;	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root
Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterizat	Greater than 70% favorable for epil and fish cover; m submerged lobs, cobble or other si at stage to allow potential (i.e., log not new fall and in the submerged and firm signated and firm simulated and submergonumon.	6 of substrate faunal colonization nix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root	40-70% mix of st suited for full colpotential; adequa maintenance of presence of addit the form of newfa prepared for colo at high end of sea mut may be dom mats and submer present.	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 11 and, mud, or clay; inant; some root	Mai 20-40% mix of st habitat availabilit desirable; substradisturbed or removal to the sturbed of the sturbed o	table habitat; ty less then the frequently oved.  8 7 6 or sand bottom;	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root
Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  2. Pool Substrate Characterizat ion	Greater than 70% favorable for epil and fish cover; m submerged lobs, cobble or other si at stage to allow potential (i.e., log not new fall and in the submerged and firm signated and firm simulated and submergonumon.	6 of substrate faunal colonization aix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root ged vegetation	40-70% mix of st suited for full colpotential; adequa maintenance of presence of addit the form of newfa prepared for colo at high end of sca mud may be dom mats and submer present.	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 11 and, mud, or clay; inant; some root ged vegetation	Mai 20-40% mix of st habitat availabilit desirable; substra disturbed or remove the substrate of the substra	able habitat; ty less then the frequently oved.  8 7 6 or sand bottom; tat; no submerged	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root mat or vegetation.
Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  2. Pool Substrate Characterizat ion  SCORE	Greater than 70% favorable for epii and fish cover; m submerged lobs, cobble or other si at stage to allow potential (i.e., log not new fall and size and firm signated and firm signated and submer conumon.	6 of substrate faunal colonization aix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root ged vegetation  18 17 16 e-shallow, large-	40-70% mix of st suited for full colpotential; adequa maintenance of presence of addit the form of newfa prepared for colo at high end of sca mud may be dom mats and submer present.	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 11 and, mud, or clay; inant; some root ged vegetation	Mai  20-40% mix of si habitat availabilit desirable; substra disturbed or remo  10 9  All mud or clay of little or no root m vegetation.	able habitat; ty less then the frequently oved.  8 7 6 or sand bottom; hat; no submerged	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root mat or vegetation.
Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  2. Pool Substrate Characterizat ion  SCORE  3. Pool	Greater than 70% favorable for epii and fish cover; m submerged lobs, cobble or other si at stage to allow potential (i.e., log not new fall and in 20 19 19 19 19 19 19 19 19 19 19 19 19 19	6 of substrate faunal colonization aix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root ged vegetation  18 17 16 e-shallow, large-	40-70% mix of st suited for full colpotential; adequa maintenance of presence of addit the form of newfa prepared for colo at high end of sca mud may be dom mats and submer present.	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 11 and, mud, or clay; inant; some root ged vegetation	Mai 20-40% mix of st habitat availabilit desirable; substradisturbed or removed and the substradisturbed or removed in the substradisturbed or removed in the substradisturbed or removed in the substrate of the	able habitat; ty less then the frequently oved.  8 7 6 or sand bottom; hat; no submerged	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root mat or vegetation.  5 4 3 2 1  Majority of pools small-shallow or
Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  2. Pool Substrate Characterizat ion  SCORE	Greater than 70% favorable for epit and fish cover; m submerged lobs, cobble or other stat stage to allow potential (i.e., lognot new fall and in the substagravel and firm stats and submer common.  20 19  Even mix of large deep, small-shalled.	6 of substrate faunal colonization aix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root ged vegetation  18 17 16 e-shallow, large-	40-70% mix of st suited for full colpotential; adequa maintenance of presence of addit the form of newfa prepared for colo at high end of sca mud may be dom mats and submer present.	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 11 and, mud, or clay; inant; some root ged vegetation	Mai 20-40% mix of st habitat availabilit desirable; substradisturbed or removed and the substradisturbed or removed in the substradisturbed or removed in the substradisturbed or removed in the substrate of the	able habitat; ty less then the frequently oved.  8 7 6 or sand bottom; hat; no submerged	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root mat or vegetation.  5 4 3 2 1  Majority of pools small-shallow or
Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterization  SCORE  3. Pool Variability	Greater than 70% favorable for epit and fish cover; m submerged lobs, cobble or other stat stage to allow potential (i.e., log not new fall and the substrate of substrate and firms mats and submergonumon.  20 19 Even mix of large deep, small-shall pools present.	6 of substrate faunal colonization nix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root ged vegetation  18 17 16 e-shallow, large- ow, small-deep	40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sea 15 //14 //14 Mixture of soft samud may be dom mats and submerapresent.  15 14 Majority of pool few shallow.	ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate ale).  13 12 11 and, mud, or clay; inant; some root ged vegetation	Mai 20-40% mix of st habitat availabilit desirable; substradisturbed or remove the sturbed able habitat; by less then ate frequently oved.  8 7 6 or sand bottom; nat; no submerged  8 7 6 uch more sep pools.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root mat or vegetation.  5 4 3 2 1  Majority of pools small-shallow or pools absent	
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	Little or no enlargement of islands	Some new increase in bar	Moderate deposition of new gravel,	Heavy deposits of fine material,
	or point bars and less than 5%	formation, mostly from gravel,	sand or fine sediment on old and	increased bar development; more
	(<20% for low-gradient streams) of		new bars; 30-50% (50-80% for low	
	the bottom affected by sediment	50% for low-gradient) of the	•	
4. Sediment	-	• .	gradient) of the bottom affected;	of the bottom changing frequently
Deposition	deposition.	bottom affected; slight deposition	sediment deposits at obstructions,	pools almost absent due to
		in pools.	constrictions, and bends; moderate	substantial sediment deposition.
			deposition of pools prevalent.	
			i	
SCORE	20 19 18 17 16	15 14 (13) 12 11	10 9 8 7 6	6 4 3 3 1
SCORE	20 19 18 17 10	13 14 (13) 12 11	10 9 8 7 6	3 4 3 2 1
5. Channel	Water reaches base of both lower	Water fills >75% of the available	Water fills 25-75% of the available	Very little water in channel and
	banks, and minimal amount of	channel; or <25% of channel	channel, and/or riffle substrates are	mostly present as standing pools.
Flow Status	channel substrate is exposed	substrate is exposed.	mostly exposed.	
	-	-		
			L	
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 /8 / 7 6	5 4 3 2 1
	Channelization or dredging absent	Some channelization present,	Channelization may be extensive;	Banks shored with gabion or
	or minimal; stream with normal	usually in areas of bridge	embankments or shoring structures	_
( Channal	pattem.	abutments, evidence of past	present on both banks; and 40-80%	i
o. Channel		channelization, i.e., dredging,	of stream reach channelized and	Instream habitat greatly altered or
Alteration		(greater than past 20 years) may be	1	removed entirely.
		1.0	distripted.	i enoved entirely.
		present, but recent channelization		
		is not present.		
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 (8) 7 6	5 4 3 2 1
	The bends in the stream increase	The bends in the stream increase	The bends in the stream increase	Channel straight; waterway has
	the stream length 3 to 4 times	the stream length 1 to 2 times	the stream length 1 to 2 times	been channelized for a long
	longer than if it was in a straight	longer than if it was in a straight	longer than if it was in a straight	distance.
	line. (Note-channel braiding is	line.	line.	tiistanee.
7. Channel		inte.	inde.	
Sinuosity	considered normal in coastal plains			,
Sinuosity	and other low-lying areas. This			
	parameter is not easily rated in			
	these areas.		İ	
CCORE	20 10 19 17 16	15 14 12 12 11	10 9 8 7 6	5 4 3 2 1
SCORE	20 19 18 17 16	15 14 13 12 11		
8. Bank	Banks stable; evidence of erosion	Moderately stable; infrequent,	Moderatly unstable; 30-60% of	Unstable; many eroded areas;
	or bank failure absent or minimal;	small areas of erosion mostly	bank in reach has areas of erosion;	"raw" areas frequent along straight
Stability	little potential for future problems.	healed over. 5-30% of bank in	high erosion potential during	sections and bends; obvious bank
(score each	<5% of bank affected.	reach has areas of erosion.	floods.	sloughing; 60-100% of bank has
bank)				erosional scars.
		*		
Note: determine				
left or right side				
by facing				
downstream				
SCORE	Left Bank 10 9	8 7 6	5 4 3	2 1 0
(LB)			1	
SCORE	Right Bank 10 9	8 7 6	5 4 3	2 1 0
	Right Dank 10 9		1 1	]
(RB)	1 000/ 51 1 1		1 co 700/ cd	II 4
	More than 90% of the streambank	70-90% of the streambank	50-70% of the streambank	Less than 50% of the streambank
	surfaces and immediate riparian	surfaces covered by native	surfaces covered by vegetation;	surfaces covered by vegetation,
9. Vegetative	zone covered by native vegetation,	vegetation, but one class of plants	disruption obvious; patches of bare	disruption of streambank
Protection	including shrubs, or nonwoody	is not well represented; disruption	soil or closely cropped vegetation	vegetation is very high; vegetation
	macrophytes; vegeative disruption	evident but not affecting full plant	common; less than one half of the	has been removed to 5 cm or less
(score each	through grazing or mowing minima	growth potential to any great	potential plant stubble height	in stubble height.
bank)	or not evident; almost all plants	extent; more than one half of the	remaining.	1
	allowed to grow naturally.	potential plant stubble height	1	<u> </u>
	g. v	remaining.		ł.
			<del>                                     </del>	2 1 0
SCORE	Left Bank 10 9	8 7 6	(5) 4 3	2 1 0
(LB)				
SCORE	Right Bank 10 9	8 7 6	(5) 4 3	2 1 0
(RB)		<u> </u>		
	Width of riparian zone >18 meters;	Width of riparian zone 12-18	Width of riparian zone 6-12	Width of riparian zone <6 meters;
	human activities (i.e., parking lots,	meters; human activites have	meters; human activities have	little or no riparian vegetation due
	roadbeds, clear-cuts, lawns, or	impacted zone only minimally.	impacted zone a great deal.	to human activity.
		Impacted zone only initimatity.	Impacted zone a great tieat.	is aminimum totting.
10. Riparian	crops) have not impacted zone.	1	1	
Vegetative	}	1	1	1
	1	1	1	
Zone Width	1	1		
(score each		1	1	1
bank riparian		1	1	1
zone)	1	l	1	1
	Left Bank 10 9	8 7 (6)	5 4 3	2 1 0
SCORE	Left Bank 10 9			1 ~ ' '
(LB)	Right Bank 10 9	8 7 6	5 4 (3)	2 1 0
SCORE		. x / 6		
SCORE	Right Bank 10 9	1		1 - ' '
(RB)	Right Bank 10 9	, ,		

### Low Gradient Stream Data Sheet

Stream Name:	Uname	a Trib.	of Lt	4C	Location: W		5.C09 + 10
Station #: 24	4+36	Mile:			Basin/Watersh		
LAT.:		LONG.:			County: Clo	rk USGS 7	'.5 TOPO:
Date: 7/28	08 Time:	AM	PM		Investigators:	LH + 55	
		Type Sam	ple: P-Chem	Macroinvert	ebrate Fish	Bacteria	
Weather:		Now	Past 24 hours		Has there been	heavy rain in la	st 7 days?
			ө Heavy Rain		Yes (	No)	
l			e Steady Rain		Air Temperatu	re 80 °F.	
			o Intermittent S	Showers		in past 24 hours	in 💍
			e Clear/Sunny		25 % Cloud		
P-Che	em: Temp (°			6Saturation	pH (S.U.)	Cond.	Grab
Instream Wat		Local Waters	· • /		p11 (0.01)		
Features:	ersnea		urrounding Land	d Llea			
1	2'					F .	
Stream Width:	<del></del> ,,	e Surface Mini	-	θ Construction		e Forest	
Range of Deptl		e Deep Mining	,	e Commercial		Θ Pasture / Gra	zing
Average Veloc	ity: <u>Ol</u> ft/s	θ Oil Wells		e Industrial		θ Silviculture	
Discharge:	cfs	e Land Dispose	al	ө Row Crops		⊕ Urban Runof	f / Storm Sewers
Est. Reach Len	gth: 50 '			İ			
Hydraulic Stru	ctures:		Stream Flow:			Stream Type:	
e Dams	e Bridge Abuti	ments	ө Dry	θ Pooled	e Low	Θ Perennial	Θ Intermittent
e Island	e Waterfalls		e Normal	θ High	`	e Ephemeral	ө Ѕеер
Other CU		NIO	e Very Rapid с	•			· · · · · · · · · · · · · · · · · · ·
		Dom. Tree / Sh				<u> </u>	Channel Alterations:
Riparian Veget		Dom. Tree / Sh	nuu raxa	Canopy Cover:			
Dominate Type			-	θ Fully Expose			θ Dredging
Θ Trees	o Shrubs			e Partially Sha		•	θ Channelization
o Grasses	e Herbaceous	•		ө Partially Exp			θ Fullor θ Partial)
Number of Stra	ata			e Fully Shaded	(75-100%)		
Substrate e Est	. е Р.С.		Riffle _	20 %	Run_	%	Pool <u>80 %</u>
Silt / Clay (< 0	.06 mm)		5				5
Sand (0.06 - 2	mm)		10				zo
Gravel (2 - 64			60				70
							_
Cobble (64 - 2)	ጎለ ጠጠነ		·	^			
Cobble (64 - 2)			<i>Z(</i>	2			5
Boulders ( > 2:			0	2			2
Boulders ( > 2: Bedrock			_		Catagory		2
Boulders ( > 2: Bedrock Habitat	56 mm)		5	Condition	Category		
Boulders ( > 2: Bedrock	56 mm)	timal	O Subo	Condition ptimal	Mar	ginal	Poor
Boulders ( > 2: Bedrock Habitat	56 mm) Opi	of substrate	Subo 40-70% mix of st	Condition ptimal able habitat; well-	<b>Mar</b> 20-40% mix of st	able habitat;	Poor Less than 20% stable habitat; lack
Boulders ( > 2: Bedrock Habitat	Opt Greater than 70% favorable for epit	of substrate faunal colonization	Subo  40-70% mix of st suited for full colo	Condition ptimal able habitat; well-onization	<b>Mar</b> 20-40% mix of st habitat availabilit	able habitat; y less then	Poor Less than 20% stable habitat; lack of habitat is obvious; substrate
Boulders ( > 2: Bedrock Habitat	Opt Greater than 70% favorable for epit and fish cover; m	6 of substrate faunal colonization iix of snags,	Subo  Subo  40-70% mix of st suited for full col- potential; adequa	Condition ptimal able habitat; well-onization te habitat for	Mar 20-40% mix of st habitat availabilit desirable; substra	able habitat; y less then te frequently	Poor Less than 20% stable habitat; lack
Boulders ( > 2: Bedrock Habitat Parameter	Opti Greater than 70% favorable for epit and fish cover; m submerged lobs,	of substrate faunal colonization ix of snags, undercut banks,	Subo  Subo  40-70% mix of st suited for full col potential; adequa maintenance of po	Condition ptimal able habitat; well-onization te habitat for opulations;	<b>Mar</b> 20-40% mix of st habitat availabilit	able habitat; y less then te frequently	Poor Less than 20% stable habitat; lack of habitat is obvious; substrate
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal	Opt Greater than 70% favorable for epit and fish cover; in submerged lobs, cobble or other si	of substrate faunal colonization ix of snags, undercut banks, table habitat and	Subo  Subo  40-70% mix of st suited for full col potential; adequa maintenance of popresence of addit	Condition ptimal able habitat; well-onization te habitat for opulations; ional substrate in	Mar 20-40% mix of st habitat availabilit desirable; substra	able habitat; y less then te frequently	Poor Less than 20% stable habitat; lack of habitat is obvious; substrate
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available	Opp Greater than 70% favorable for epit and fish cover, in submerged lobs, cobble or other si at stage to allow	of substrate faunal colonization ix of snags, undercut banks, table habitat and full colonication	Subo  40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa	Condition ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet	Mar 20-40% mix of st habitat availabilit desirable; substra	able habitat; y less then te frequently	Poor Less than 20% stable habitat; lack of habitat is obvious; substrate
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Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover	Greater than 70% favorable for epit and fish cover; m submerged lobs, cobble or other st at stage to allow potential (i.e., log not new fall and metal components).	of substrate faunal colonization ix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).	Subol 40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca	Condition ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate alle).	Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	able habitat; y less then te frequently oved.	Poor Less than 20% stable habitat; lack of habitat is obvious, substrate unstable or lacking.
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available	Greater than 70% favorable for epit and fish cover; m submerged lobs, cobble or other st at stage to allow potential (i.e., log not new fall and many composition).	of substrate faunal colonization ix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).	Subol 40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newfa prepared for colo at high end of sca	Condition ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate alle).	Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	able habitat; y less then the frequently oved.	Poor Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
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Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterizat ion  SCORE  3. Pool Variability  SCORE	Greater than 70% favorable for epit and fish cover; m submerged lobs, cobble or other si at stage to allow potential (i.e., log not new fall and in the fall and favorable for epit and firm si mats and submerged lobe.  20 19 1  Even mix of large deep, small-shall pools present.	6 of substrate Faunal colonization aix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  8 17 16 ate materials, with and prevalent; root ged vegetation  18 17 16shallow, large- ow, small-deep	Subo  Subo  40-70% mix of st suited for full colopotential; adequal maintenance of puresence of addit the form of newfaprepared for colopat high end of scale in the form of scale in the form of scale in the form of newfaprepared for colopat high end of scale in the form of scale in	Condition ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate alle).  13 12 11 and, mud, or clay; inant; some root ged vegetation  13 12 11 large-deep; very	Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo  10 9 All mud or clay of little or no root m vegetation.  10 9 Shallow pools mi prevalent than de	able habitat; y less then te frequently oved.  8 7 6 or sand bottom; hat; no submerged  8 7 6 or both more ep pools.	Poor  Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root mat or vegetation.  5 4 3 2 1  Majority of pools small-shallow or pools absent
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterizat ion  SCORE  3. Pool Variability  SCORE	Greater than 70% favorable for epit and fish cover; m submerged lobs, cobble or other si at stage to allow potential (i.e., log not new fall and in the fall and favorable for epit and firm si mats and submerged lobe.  20 19 1  Even mix of large deep, small-shall pools present.	6 of substrate Faunal colonization aix of snags, undercut banks, table habitat and full colonication gs/snags that are not transient).  8 17 16 ate materials, with and prevalent; root ged vegetation  18 17 16shallow, large- ow, small-deep	Subo  Subo  40-70% mix of st suited for full colopotential; adequal maintenance of puresence of addit the form of newfaprepared for colopat high end of scale in the form of scale in the form of scale in the form of newfaprepared for colopat high end of scale in the form of scale in	Condition ptimal able habitat; well- onization te habitat for opulations; ional substrate in all, but not yet nization (may rate alle).  13 12 11 and, mud, or clay; inant; some root ged vegetation  13 12 11 large-deep; very	Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo  10 9 All mud or clay of little or no root m vegetation.  10 9 Shallow pools mi prevalent than de	able habitat; y less then te frequently oved.  8 7 6 or sand bottom; hat; no submerged  8 7 6 or both more ep pools.	Poor  Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1  Hard-pan clay or bedrock; no root mat or vegetation.  5 4 3 2 1  Majority of pools small-shallow or pools absent
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	· ·	Some new increase in bar	Moderate deposition of new gravel,	
l i	or point bars and less than 5% (<20% for low-gradient streams) of	formation, mostly from gravel,	sand or fine sediment on old and new bars; 30-50% (50-80% for low	increased bar development; more
l t	the bottom affected by sediment	50% for low-gradient) of the	gradient) of the bottom affected;	of the bottom changing frequently
** *********	deposition.	bottom affected; slight deposition	sediment deposits at obstructions,	pools almost absent due to
Deposition		in pools.	constrictions, and bends; moderate	substantial sediment deposition.
			deposition of pools prevalent.	
SCORE	20 19 18 17 16	15 (14) 13 12 11	10 9 8 7 6	5 4 3 2 1
	W	W 60-> 760/ - 645 11-11-	W 611 26 760/ Cd 3.11	tr that is a first to the
5 Channel	Water reaches base of both lower banks, and minimal amount of	Water fills >75% of the available channel; or <25% of channel	Water fills 25-75% of the available channel, and/or riffle substrates are	
Tit and Charles	channel substrate is exposed	substrate is exposed.	mostly exposed.	meetly present as standing position
	•	•		
SCORE	20 19 (18) 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
	• •	Some channelization present,	Channelization may be extensive;	Banks shored with gabion or
	or minimal; stream with normal	usually in areas of bridge	-	cement, over 80% of the stream
o. Channer	pattern.	abutments; evidence of past channelization, i.e., dredging,	present on both banks; and 40-80% of stream reach channelized and	reach channenzed and disrupted.  Instream habitat greatly altered or
Alteration		(greater than past 20 years) may be	1	removed entirely.
		present, but recent channelization	·	, and the second
20055	20 10 10 17 17	is not present.	10 0 0	
SCORE	20 19 18 17 16  The bends in the stream increase	The bends in the stream increase	The bends in the stream increase	5 4 3 2 1 Channel straight; waterway has
I I	the stream length 3 to 4 times	the stream length 1 to 2 times	the stream length 1 to 2 times	been channelized for a long
I	longer than if it was in a straight	longer than if it was in a straight	longer than if it was in a straight	distance.
7 Channal I	line. (Note-channel braiding is	line.	line.	
	considered normal in coastal plains and other low-lying areas. This			
, , , , , , , , , , , , , , , , , , ,	parameter is not easily rated in			
	these areas.			
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
X. Kank I	Banks stable; evidence of erosion	Moderately stable, infrequent,	Moderatly unstable, 30-60% of	Unstable; many eroded areas;
Stability	or bank failure absent or minimal; little potential for future problems.	small areas of erosion mostly healed over. 5-30% of bank in	bank in reach has areas of erosion; high erosion potential during	"raw" areas frequent along straight sections and bends; obvious bank
/	<5% of bank affected.	reach has areas of erosion.	floods.	sloughing; 60-100% of bank has
bank)				erosional scars.
Note: determine				
left or right side				
by facing downstream				
SCORE	Left Bank 10 9	8 7 6	5 4 3	. 2 1 0
(LB) SCORE	Right Bank 10 9	8 7 6	5 4 3	2 1 0
(RB)	Rigili Balik 100 9	8 , 0	<b>3 4</b> 3	4 I V
	More than 90% of the streambank	70-90% of the streambank	50-70% of the streambank	Less than 50% of the streambank
l l	surfaces and immediate riparian zone covered by native vegetation,	surfaces covered by native vegetation, but one class of plants	surfaces covered by vegetation; disruption obvious; patches of bare	surfaces covered by vegetation; disruption of streambank
9. vegetative	including shrubs, or nonwoody	is not well represented; disruption	soil or closely cropped vegetation	vegetation is very high; vegetation
/	macrophytes; vegeative disruption	evident but not affecting full plant	common, less than one half of the	has been removed to 5 cm or less
i I	through grazing or mowing minimal or not evident; almost all plants	growth potential to any great extent; more than one half of the	potential plant stubble height remaining.	in stubble height.
1	allowed to grow naturally.	potential plant stubble height	remaining.	
		remaining.		
SCORE	Left Bank 10 /9	8 7 6	5 4 3	2 1 0
(LB) SCORE	Left Bank 10			1
		8 7 6	5 4 3	2 1 0
(RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
(RB)		8 7 6 Width of riparian zone 12-18	5 4 3 Width of riparian zone 6-12	2 1 0  Width of riparian zone <6 meters;
(RB)	Right Bank 10 9 Width of riparian zone >18 meters; human activities (i.e., parking lots,	Width of riparian zone 12-18 meters; human activites have	Width of riparian zone 6-12 meters; human activities have	Width of riparian zone <6 meters; little or no riparian vegetation due
(RB)	Right Bank 10 9 Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or	Width of riparian zone 12-18	Width of riparian zone 6-12	Width of riparian zone <6 meters;
(RB) 10. Riparian	Right Bank 10 9 Width of riparian zone >18 meters; human activities (i.e., parking lots,	Width of riparian zone 12-18 meters; human activites have	Width of riparian zone 6-12 meters; human activities have	Width of riparian zone <6 meters; little or no riparian vegetation due
(RB)  10. Riparian Vegetative	Right Bank 10 9 Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or	Width of riparian zone 12-18 meters; human activites have	Width of riparian zone 6-12 meters; human activities have	Width of riparian zone <6 meters; little or no riparian vegetation due
(RB) 10. Riparian	Right Bank 10 9  Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or	Width of riparian zone 12-18 meters; human activites have	Width of riparian zone 6-12 meters; human activities have	Width of riparian zone <6 meters; little or no riparian vegetation due
(RB)  10. Riparian Vegetative Zone Width	Right Bank 10 9 Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activites have	Width of riparian zone 6-12 meters; human activities have	Width of riparian zone <6 meters; little or no riparian vegetation due
(RB)  10. Riparian Vegetative Zone Width (score each bank riparian zone)	Right Bank 10 9  Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activites have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activity.
(RB)  10. Riparian Vegetative Zone Width (score each bank riparian zone) SCORE	Right Bank 10 9 Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activites have	Width of riparian zone 6-12 meters; human activities have	Width of riparian zone <6 meters; little or no riparian vegetation due
(RB)  10. Riparian Vegetative Zone Width (score each bank riparian zone)	Right Bank 10 9  Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activites have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activity.

### Low Gradient Stream Data Sheet

Stream Name:	Lower 1	Houneds	Crook		Location: W	MU	5.C11	+ 12
Station #: /4	1+00 \$15	/al/file:	_		Basin/Watersh			
LAT.:		LONG.:			County: Clas	rK USGS 7	.5 TOPO:	1
Date: 7/28/	OF Time:	AM	PM		Investigators:	TH +2	ゴ	
-		Type Sam	ple: P-Chem	Macroinvert	ebrate Fish	Bacteria		
Weather:		Now	Past 24 hours		Has there been	heavy rain in la	st 7 days?	
			θ Heavy Rain	(	Yes)	No -		
]			θ Steady Rain		Air Temperatur			
			e Intermittent	Showers	Inches rainfall	in past 24 hours	. <b>. 2</b> . in	
		<	e Clear/Sunny	1	<b>20</b> % Cloud (	Cover.		
P-Che	m: Temp (°	C) D.O.	(mg/l) %	6Saturation	pH (S.U.)_	Cond	Grab	
Instream Wate	ershed	Local Watersl	ed Features:					
Features:	,	Predominate Su	arrounding Lan	d Use:				
Stream Width:	5	e Surface Mini	ng	e Construction		Θ Forest		
Range of Depth	1'	ө Deep Mining		e Commercial		Θ Pasture / Gra	zing	
Average Veloci		e Oil Wells		e Industrial		Θ Silviculture	J	
Discharge:	cfs	e Land Disposa	al	ө Row Crops			f / Storm Sewers	<u> </u>
Est. Reach Len		o Lana Bispose	-	o iton eleps				
Hydraulic Struc			Stream Flow:	<u> </u>		Stream Type:		
		manta		(9 Pooled	e Low	e Perennial	& Intermittent	
θ Dams	e Bridge Abut	ments	e Dry e Normal	θ High	G LUW	e Ephemeral	θ Seep	
e Island	o Waterfalls		ө Normai ө Very Rapid o			o Epitemerai	О Эсер	
θ Other		D 70: / C'				L	Channel Alterati	one:
Riparian Veget		Dom. Tree / Sh	irub Taxa	Canopy Cover:	<del></del>			Olis.
Dominate Type				o Fully Expose			e Dredging Channelization	
θ Trees	θ Shrubs			θ Partially Shad				
1	o Herbaceous	>		e Partially Exp	` ,		(e Full or e Parti	iai)
Number of Stra				e Fully Shaded				
Substrate e Est			Riffle_	%	Run	%	Pool	%
Silt / Clay (< 0						<u>.</u>		
Sand (0.06 - 2	mm)				<u>.</u>	5	5	
Gravel (2 - 64 )	mm)		75	-	73	5	75	
	\							
Cobble (64 - 2:	56 mm)		20		70	)	20	
Cobble (64 - 2) Boulders ( > 2)	<u></u>		20		7.0	<u> </u>	20	
	<u></u>		20		70	)	20	
Boulders ( > 25	<u></u>		7.0	Condition	Category			
Boulders ( > 25 Bedrock	56 mm)	timal		Condition optimal	Category	ginal	Poo	or
Boulders ( > 25 Bedrock Habitat	56 mm)		Subo		Category	ginal		
Boulders ( > 25 Bedrock Habitat	Op Greater than 70%		Subo 40-70% mix of si suited for full col	ptimal table habitat; well- lonization	Category Mar 20-40% mix of st habitat availabilit	ginal able habitat; y less then	Pool Less than 20% state of habitat is obvious	ole habitat; lack as; substrate
Boulders ( > 29 Bedrock Habitat Parameter	Op Greater than 70% favorable for epi and fish cover; n	% of substrate faunal colonization nix of snags,	Subo 40-70% mix of si suited for full col potential; adequa	ptimal table habitat; well- lonization ate habitat for	Category Mar 20-40% mix of st habitat availabilit desirable; substra	ginal able habitat; y less then tte frequently	Pool Less than 20% stab	ole habitat; lack as; substrate
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal	Op Greater than 70% favorable for epi and fish cover; n submerged lobs,	6 of substrate faunal colonization nix of snags, undercut banks,	Subo 40-70% mix of straited for full col potential; adequa	ptimal table habitat; well- lonization ate habitat for opulations;	Category Mar 20-40% mix of st habitat availabilit	ginal able habitat; y less then tte frequently	Pool Less than 20% state of habitat is obvious	ole habitat; lack as; substrate
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate /	Greater than 70% favorable for epi and fish cover, n submerged lobs, cobble or other s	6 of substrate faunal colonization nix of snags, undercut banks, stable habitat and	Subo 40-70% mix of signification for full collipotential; adequal maintenance of presence of additional subsection for the subsection for sub	ptimal table habitat; well- lonization ste habitat for sopulations; tional substrate in	Category Mar 20-40% mix of st habitat availabilit desirable; substra	ginal able habitat; y less then tte frequently	Pool Less than 20% state of habitat is obvious	ole habitat; lack as; substrate
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available	Greater than 70% favorable for epi and fish cover; n submerged lobs, cobble or other s at stage to allow	6 of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication	Subo 40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newf	ptimal table habitat; well- lonization ate habitat for lopulations; tional substrate in all, but not yet	Category Mar 20-40% mix of st habitat availabilit desirable; substra	ginal able habitat; y less then tte frequently	Pool Less than 20% state of habitat is obvious	ole habitat; lack as; substrate
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate /	Greater than 709 favorable for epi and fish cover; n submerged lobs, cobble or other s at stage to allow potential (i.e., lo	% of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are	Subo 40-70% mix of st suited for full col potential; adequa maintenance of p presence of addit the form of newf	ptimal table habitat; well- lonization the habitat for populations; tional substrate in all, but not yet onization (may rate	Category Mar 20-40% mix of st habitat availabilit desirable; substra	ginal able habitat; y less then tte frequently	Pool Less than 20% state of habitat is obvious	ole habitat; lack as; substrate
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available	Greater than 70% favorable for epi and fish cover; n submerged lobs, cobble or other s at stage to allow	% of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are	Subo 40-70% mix of si suited for full col potential; adequa maintenance of p presence of addit the form of newf prepared for colo	ptimal table habitat; well- lonization the habitat for populations; tional substrate in all, but not yet onization (may rate	Category Mar 20-40% mix of st habitat availabilit desirable; substra	ginal able habitat; y less then tte frequently	Pool Less than 20% state of habitat is obvious	ole habitat; lack as; substrate
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available	Greater than 70% favorable for epi and fish cover; n submerged lobs, cobble or other s at stage to allow potential (i.e., lo not new fall and	% of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are	Subo  40-70% mix of stated for full collipotential; adequal maintenance of presence of addit the form of newforepared for color at high end of sca	ptimal table habitat; well- lonization the habitat for populations; tional substrate in all, but not yet onization (may rate	Category Mar 20-40% mix of st habitat availabilit desirable; substra	ginal able habitat; y less then tte frequently	Pool Less than 20% state of habitat is obvious	ole habitat; lack is; substrate
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Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover	Greater than 70° favorable for epi and fish cover; n submerged lobs, cobble or other s at stage to allow potential (i.e., lo not new fall and 20 19	% of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are not transient).	Subo  40-70% mix of state of full colpotential; adequate maintenance of presence of addit the form of newforepared for colotat high end of scathigh end of sca	ptimal table habitat; well- tonization ate habitat for copulations; tional substrate in all, but not yet onization (may rate ale).  13 12 11 and, mud, or clay;	Category Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	ginal able habitat; y less then tte frequently oved.	Poor Less than 20% stalt of habitat is obvious unstable or lacking	ole habitat; lack is; substrate
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Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate	Greater than 709 favorable for epi and fish cover; n submerged lobs, cobble or other s at stage to allow potential (i.e., lo not new fall and 20 19  Mixture of subst gravel and firm s mats and submer common.	% of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are not transient).  18 17 16  rate materials, with sand prevalent; root	Subo  40-70% mix of standed for full colpotential; adequal maintenance of presence of addit the form of newforepared for colotat high end of scanded for the form of seasons at high end of scanded for the form of seasons fo	ptimal table habitat; well- tonization ate habitat for copulations; tional substrate in all, but not yet onization (may rate ale).  13 12 11 and, mud, or clay; ninant; some root	Category Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	ginal able habitat; y less then tte frequently oved.  8 7 6 or sand bottom;	Less than 20% state of habitat is obvious unstable or lacking	ole habitat; lack is; substrate
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterizat	Greater than 709 favorable for epi and fish cover; n submerged lobs, cobble or other s at stage to allow potential (i.e., lo not new fall and 20 19  Mixture of subst gravel and firm s mats and submer common.	% of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are not transient).  18 17 16  rate materials, with sand prevalent; root	Subo  40-70% mix of state for full col potential; adequa maintenance of p presence of addit the form of newf prepared for color at high end of scathigh end of	ptimal table habitat; well- tonization ate habitat for copulations; tional substrate in all, but not yet onization (may rate ale).  13 12 11 and, mud, or clay; ninant; some root	Category Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	ginal able habitat; y less then tte frequently oved.  8 7 6 or sand bottom;	Less than 20% state of habitat is obvious unstable or lacking	ole habitat; lack is; substrate
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate	Greater than 709 favorable for epi and fish cover; n submerged lobs, cobble or other s at stage to allow potential (i.e., lo not new fall and 20 19  Mixture of subst gravel and firm s mats and submer common.	% of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are not transient).  18 17 16  rate materials, with sand prevalent; root	Subo  40-70% mix of state for full col potential; adequa maintenance of p presence of addit the form of newf prepared for color at high end of scathigh end of	ptimal table habitat; well- tonization ate habitat for copulations; tional substrate in all, but not yet onization (may rate ale).  13 12 11 and, mud, or clay; ninant; some root	Category Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	ginal able habitat; y less then tte frequently oved.  8 7 6 or sand bottom;	Less than 20% state of habitat is obvious unstable or lacking	ole habitat; lack is; substrate
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterizat	Greater than 709 favorable for epi and fish cover; n submerged lobs, cobble or other s at stage to allow potential (i.e., lo not new fall and 20 19  Mixture of subst gravel and firm s mats and submer common.	% of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with sand prevalent; root	Subo  40-70% mix of state for full col potential; adequa maintenance of p presence of addit the form of newf prepared for color at high end of scathigh end of	ptimal table habitat; well- tonization ate habitat for copulations; tional substrate in all, but not yet onization (may rate ale).  13 12 11 and, mud, or clay; ninant; some root	Category Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	ginal able habitat; y less then tte frequently oved.  8 7 6 or sand bottom;	Less than 20% state of habitat is obvious unstable or lacking	ole habitat; lack is; substrate
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterizat	Greater than 70% favorable for epi and fish cover, n submerged lobs, cobble or other s at stage to allow potential (i.e., lo not new fall and 20 19  Mixture of subst gravel and firm s mats and submer common.	% of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with sand prevalent; root	Subo  40-70% mix of state for full col potential; adequa maintenance of p presence of addit the form of newf prepared for color at high end of scathigh end of	ptimal table habitat; well- tonization ate habitat for copulations; tional substrate in all, but not yet onization (may rate ale).  13 12 11 and, mud, or clay; ninant; some root	Category Mar 20-40% mix of st habitat availabilit desirable; substra disturbed or remo	ginal able habitat; y less then tte frequently oved.  8 7 6 or sand bottom;	Less than 20% stat of habitat is obviou unstable or lacking  5 4 3 Hard-pan clay or b mat or vegetation.	ple habitat; lack is; substrate  2 1 edrock; no root
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  2. Pool Substrate Characterizat ion	Greater than 70% favorable for epi and fish cover, n submerged lobs, cobble or other s at stage to allow potential (i.e., lo not new fall and 20 19 Mixture of subst gravel and firm s mats and submer common.	% of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root rged vegetation	Subo 40-70% mix of structed for full colliportential; adequared maintenance of presence of addit the form of newforepared for color at high end of scale for the form of the f	ptimal table habitat; well- lonization ate habitat for copulations; tional substrate in all, but not yet mization (may rate ale).  13 12 11 and, mud, or clay; mant; some root rged vegetation	Category  Mar  20-40% mix of st habitat availabilit desirable; substra disturbed or remo	ginal able habitat; y less then te frequently oved.  8 7 6 or sand bottom; hat; no submerged	Less than 20% stat of habitat is obvious unstable or lacking 5 4 3 Hard-pan clay or b mat or vegetation.	ple habitat; lack is; substrate  2 1 edrock; no root
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  2. Pool Substrate Characterizat ion	Greater than 709 favorable for epi and fish cover, n submerged lobs, cobble or other s at stage to allow potential (i.e., lo not new fall and 20 19  Mixture of subst gravel and firm s mats and submer common.	6 of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root rged vegetation	Subo 40-70% mix of st suited for full col potential; adequa maintenance of addit the form of newf prepared for colo at high end of sca  15 14  Mixture of soft s mud may be dom mats and submer present.	ptimal table habitat; well- lonization ate habitat for sopulations; tional substrate in all, but not yet substrate in all, but not yet ale).  13 12 11 and, mud, or clay; ninant; some root aged vegetation	Category  Mar  20-40% mix of st habitat availabilit desirable; substra disturbed or remo	ginal able habitat; y less then te frequently oved.  8 7 6 or sand bottom; hat; no submerged	Less than 20% stat of habitat is obviou unstable or lacking  5 4 3 Hard-pan clay or b mat or vegetation.	ple habitat; lack is; substrate  2 1 edrock; no root
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterizat ion  SCORE	Greater than 70% favorable for epi and fish cover, n submerged lobs, cobble or other s at stage to allow potential (i.e., lo not new fall and 20 19  Mixture of subst gravel and firm s mats and submercommon.	6 of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root rged vegetation	Subo 40-70% mix of structed for full colliportential; adequared maintenance of presence of addit the form of newforepared for color at high end of scale for the form of the f	ptimal table habitat; well- lonization ate habitat for sopulations; tional substrate in all, but not yet substrate in all, but not yet ale).  13 12 11 and, mud, or clay; ninant; some root aged vegetation	Category  Mar  20-40% mix of st habitat availabilit desirable; substra disturbed or remo	ginal able habitat; y less then te frequently oved.  8 7 6 or sand bottom; hat; no submerged	Less than 20% stat of habitat is obvious unstable or lacking 5 4 3 Hard-pan clay or b mat or vegetation.	ple habitat; lack is; substrate  2 1 edrock; no root
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  2. Pool Substrate Characterization  SCORE  3. Pool	Greater than 709 favorable for epi and fish cover, n submerged lobs, cobble or other s at stage to allow potential (i.e., lo not new fall and 20 19  Mixture of subst gravel and firm s mats and submer common.	6 of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root rged vegetation	Subo 40-70% mix of structed for full colliportential; adequared maintenance of presence of addit the form of newforepared for color at high end of scale for the form of the f	ptimal table habitat; well- lonization ate habitat for sopulations; tional substrate in all, but not yet substrate in all, but not yet substrate in all, but not get substrate in all, but	Category  Mar  20-40% mix of st habitat availabilit desirable; substra disturbed or remo	ginal able habitat; y less then te frequently oved.  8 7 6 or sand bottom; hat; no submerged	Less than 20% stat of habitat is obvious unstable or lacking 5 4 3 Hard-pan clay or b mat or vegetation.	ple habitat; lack is; substrate  2 1 edrock; no root
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterization  SCORE  3. Pool Variability	Greater than 709 favorable for epi and fish cover; n submerged lobs, cobble or other s at stage to allow potential (i.e., lo not new fall and 20 19  Mixture of subst gravel and firm s mats and submercommon.	6 of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are not transient).  18 17 16  rate materials, with and prevalent; root reed vegetation  18 17 16  re-shallow, large-low, small-deep	Subo  40-70% mix of sisuited for full colpotential; adequal maintenance of presence of addit the form of newforepared for colour high end of scale high end	ptimal table habitat; well- tonization the habitat for copulations; tional substrate in all, but not yet onization (may rate ale).  13 12 11 and, mud, or clay; ninant; some root ged vegetation  13 12 11 large-deep; very	Category  Mar  20-40% mix of st habitat availabilit desirable; substra disturbed or remo	ginal able habitat; y less then te frequently oved.  8 7 6 or sand bottom; hat; no submerged	Less than 20% stat of habitat is obvious unstable or lacking 5 4 3 Hard-pan clay or b mat or vegetation.	2 1 redrock; no root  2 1 remail-shallow or
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  2. Pool Substrate Characterization  SCORE  3. Pool Variability  SCORE	Greater than 70% favorable for epi and fish cover; n submerged lobs, cobble or other s at stage to allow potential (i.e., lo not new fall and 20 19  Mixture of subst gravel and firm s mats and submer common.  20 19  Even mix of larg deep, small-shal pools present.	6 of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are not transient).  18 17 16 rate materials, with and prevalent; root rged vegetation	Subo  40-70% mix of sisuited for full colpotential; adequal maintenance of presence of addit the form of newforepared for colour high end of scale high end	ptimal table habitat; well- lonization ate habitat for sopulations; tional substrate in all, but not yet substrate in all, but not yet substrate in all, but not get substrate in all, but	Category  Mar  20-40% mix of st habitat availabilit desirable; substra disturbed or remo  10 9  All interference of the state of the st	ginal able habitat; y less then tee frequently oved.  8 7 6 or sand bottom; hat; no submerged  8 7 6 uch more eep pools.	Less than 20% state of habitat is obvious unstable or lacking a state of lacking state of l	2 1 redrock; no root  2 1 remail-shallow or
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  SCORE  2. Pool Substrate Characterization  SCORE  3. Pool Variability	Greater than 70% favorable for epi and fish cover; n submerged lobs, cobble or other s at stage to allow potential (i.e., lo not new fall and 20 19  Mixture of subst gravel and firm s mats and submer common.  20 19  Even mix of larg deep, small-shal pools present.	6 of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are not transient).  18 17 16  rate materials, with and prevalent; root reed vegetation  18 17 16  re-shallow, large-low, small-deep	Subo  40-70% mix of sisuited for full colpotential; adequal maintenance of presence of addit the form of newforepared for colour high end of scale high end	ptimal table habitat; well- tonization the habitat for copulations; tional substrate in all, but not yet onization (may rate ale).  13 12 11 and, mud, or clay; ninant; some root ged vegetation  13 12 11 large-deep; very	Category  Mar  20-40% mix of st habitat availabilit desirable; substra disturbed or remo  10 9  All interference of the state of the st	ginal able habitat; y less then tee frequently oved.  8 7 6 or sand bottom; hat; no submerged  8 7 6 uch more eep pools.	Less than 20% state of habitat is obvious unstable or lacking a state of lacking state of l	2 1 redrock; no root  2 1 remail-shallow or
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  2. Pool Substrate Characterization  SCORE  3. Pool Variability  SCORE	Greater than 70% favorable for epi and fish cover; n submerged lobs, cobble or other s at stage to allow potential (i.e., lo not new fall and 20 19  Mixture of subst gravel and firm s mats and submer common.  20 19  Even mix of larg deep, small-shal pools present.	6 of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are not transient).  18 17 16  rate materials, with and prevalent; root reed vegetation  18 17 16  re-shallow, large-low, small-deep	Subo  40-70% mix of sisuited for full colpotential; adequal maintenance of presence of addit the form of newforepared for colour high end of scale high end	ptimal table habitat; well- tonization the habitat for copulations; tional substrate in all, but not yet onization (may rate ale).  13 12 11 and, mud, or clay; ninant; some root ged vegetation  13 12 11 large-deep; very	Category  Mar  20-40% mix of st habitat availabilit desirable; substra disturbed or remo  10 9  All interference of the state of the st	ginal able habitat; y less then tee frequently oved.  8 7 6 or sand bottom; hat; no submerged  8 7 6 uch more eep pools.	Less than 20% state of habitat is obvious unstable or lacking a state of lacking state of l	2 1 redrock; no root  2 1 remail-shallow or
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  2. Pool Substrate Characterization  SCORE  3. Pool Variability  SCORE	Greater than 70% favorable for epi and fish cover; n submerged lobs, cobble or other s at stage to allow potential (i.e., lo not new fall and 20 19  Mixture of subst gravel and firm s mats and submer common.  20 19  Even mix of larg deep, small-shal pools present.	6 of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are not transient).  18 17 16  rate materials, with and prevalent; root reed vegetation  18 17 16  re-shallow, large-low, small-deep	Subo  40-70% mix of sisuited for full colpotential; adequal maintenance of presence of addit the form of newforepared for colour high end of scale high end	ptimal table habitat; well- tonization the habitat for copulations; tional substrate in all, but not yet onization (may rate ale).  13 12 11 and, mud, or clay; ninant; some root ged vegetation  13 12 11 large-deep; very	Category  Mar  20-40% mix of st habitat availabilit desirable; substra disturbed or remo  10 9  All interference of the state of the st	ginal able habitat; y less then tee frequently oved.  8 7 6 or sand bottom; hat; no submerged  8 7 6 uch more eep pools.	Less than 20% state of habitat is obvious unstable or lacking a state of lacking state of l	2 1 redrock; no root  2 1 remail-shallow or
Boulders ( > 2: Bedrock Habitat Parameter  1. Epifaunal Substrate / Available Cover  2. Pool Substrate Characterization  SCORE  3. Pool Variability  SCORE	Greater than 70% favorable for epi and fish cover; n submerged lobs, cobble or other s at stage to allow potential (i.e., lo not new fall and 20 19  Mixture of subst gravel and firm s mats and submer common.  20 19  Even mix of larg deep, small-shal pools present.	6 of substrate faunal colonization nix of snags, undercut banks, stable habitat and full colonication gs/snags that are not transient).  18 17 16  rate materials, with and prevalent; root reed vegetation  18 17 16  re-shallow, large-low, small-deep	Subo  40-70% mix of sisuited for full colpotential; adequal maintenance of presence of addit the form of newforepared for colour high end of scale high end	ptimal table habitat; well- tonization the habitat for copulations; tional substrate in all, but not yet onization (may rate ale).  13 12 11 and, mud, or clay; ninant; some root ged vegetation  13 12 11 large-deep; very	Category  Mar  20-40% mix of st habitat availabilit desirable; substra disturbed or remo  10 9  All interference of the state of the st	ginal able habitat; y less then tee frequently oved.  8 7 6 or sand bottom; hat; no submerged  8 7 6 uch more eep pools.	Less than 20% state of habitat is obvious unstable or lacking a state of lacking state of l	2 1 redrock; no root  2 1 remail-shallow or

	Little of no enlargement of islands	Some new increase in bar	Moderate deposition of new gravel,	Home describe of Green and
		formation, mostly from gravel,	sand or fine sediment on old and	
	or point bars and less than 5% (<20% for low-gradient streams) of			increased bar development; more
		l e	new bars; 30-50% (50-80% for low	
4. Sediment	the bottom affected by sediment	50% for low-gradient) of the	gradient) of the bottom affected;	of the bottom changing frequently
Deposition	deposition.	bottom affected; slight deposition	sediment deposits at obstructions,	pools almost absent due to
		in pools.	constrictions, and bends; moderate	substantial sediment deposition.
			deposition of pools prevalent.	
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
			l	
5. Channel	Water reaches base of both lower	Water fills >75% of the available	Water fills 25-75% of the available	-
Flow Status	banks, and minimal amount of	channel; or <25% of channel	channel, and/or riffle substrates are	mostly present as standing pools.
riow Status	channel substrate is exposed	substrate is exposed.	mostly exposed.	
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 (2) 1
	Channelization or dredging absent	Some channelization present,	Channelization may be extensive;	Banks shored with gabion or
	or minimal; stream with normal	usually in areas of bridge	embankments or shoring structures	cement; over 80% of the stream
6. Channel	pattem.	abutments; evidence of past	present on both banks; and 40-80%	reach channelized and disrupted.
Alteration		channelization, i.e., dredging,	of stream reach channelized and	Instream habitat greatly altered or
Aucration		(greater than past 20 years) may be	disrupted.	removed entirely.
		present, but recent channelization		·
		is not present.		
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
	The bends in the stream increase	The bends in the stream increase	The bends in the stream increase	Channel straight; waterway has
	the stream length 3 to 4 times	the stream length 1 to 2 times	the stream length 1 to 2 times	been channelized for a long
	longer than if it was in a straight	longer than if it was in a straight	longer than if it was in a straight	distance.
	line. (Note-channel braiding is	line.	line.	
7. Channel	considered normal in coastal plains		1	
Sinuosity	and other low-lying areas. This			
, i	parameter is not easily rated in		1	
	these areas.			
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
SCORE				
8. Bank	Banks stable; evidence of erosion	Moderately stable; infrequent,	Moderatly unstable, 30-60% of	Unstable, many eroded areas,
Stability	or bank failure absent or minimal;	small areas of erosion mostly	bank in reach has areas of erosion;	"raw" areas frequent along straight
(score each	little potential for future problems.	healed over. 5-30% of bank in	high erosion potential during	sections and bends; obvious bank
bank)	<5% of bank affected.	reach has areas of erosion.	floods.	sloughing, 60-100% of bank has
Ualik)				erosional scars.
Note: determine:			1	
left or right side			1	
by facing				
downstream				
SCORE	Left Bank 10 9	8 7 6	5 4 3	2 1 0
(LB)		<u> </u>		
SCORE	Right Bank 10 9	8 (7) 6	5 4 3	2 1 0
(RB)				
	More than 90% of the streambank	70-90% of the streambank	50-70% of the streambank	Less than 50% of the streambank
	surfaces and immediate riparian	surfaces covered by native	surfaces covered by vegetation;	surfaces covered by vegetation;
9. Vegetative	zone covered by native vegetation,	vegetation, but one class of plants	disruption obvious; patches of bare	disruption of streambank
Protection				vegetation is very high; vegetation
	including shrubs, or nonwoody	is not well represented, disruption	soil or closely cropped vegetation	tt
	macrophytes; vegeative disruption	evident but not affecting full plant	common; less than one half of the	has been removed to 5 cm or less
(score each	macrophytes; vegeative disruption through grazing or mowing minimal	evident but not affecting full plant growth potential to any great	common; less than one half of the potential plant stubble height	has been removed to 5 cm or less in stubble height.
	macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants	evident but not affecting full plant growth potential to any great extent, more than one half of the	common; less than one half of the	1
(score each	macrophytes; vegeative disruption through grazing or mowing minimal	evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height	common; less than one half of the potential plant stubble height	1
(score each bank)	macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	evident but not affecting full plant growth potential to any great extent, more than one half of the potential plant stubble height remaining.	common; less than one half of the potential plant stubble height remaining.	in stubble height.
(score each bank) SCORE	macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants	evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height	common; less than one half of the potential plant stubble height	1
(score each bank) SCORE (LB)	macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9	evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height remaining.	common; less than one half of the potential plant stubble height remaining.	in stubble height.  2 I 0
(score each bank)  SCORE	macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	evident but not affecting full plant growth potential to any great extent, more than one half of the potential plant stubble height remaining.	common; less than one half of the potential plant stubble height remaining.	in stubble height.
(score each bank) SCORE (LB)	macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9	evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height remaining.  8 7 6  8 7 6	common; less than one half of the potential plant stubble height remaining.	in stubble height.
(score each bank)  SCORE	macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9  Width of riparian zone >18 meters;	evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height remaining.  8 7 6  Width of riparian zone 12-18	common; less than one half of the potential plant stubble height remaining.  5 4 3  Width of riparian zone 6-12	in stubble height.  2 1 0  2 1 0  Width of riparian zone <6 meters;
(score each bank)  SCORE	macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9  Width of riparian zone >18 meters; human activities (i.e., parking lots,	evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height remaining.  8 7 6  Width of riparian zone 12-18 meters; human activites have	common; less than one half of the potential plant stubble height remaining.  5 4 3  Width of riparian zone 6-12 meters; human activities have	in stubble height.  2 1 0  2 1 0  Width of riparian zone <6 meters; little or no riparian vegetation due
(score each bank) SCORE (LB) SCORE (RB)	macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9  Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or	evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height remaining.  8 7 6  Width of riparian zone 12-18	common; less than one half of the potential plant stubble height remaining.  5 4 3  Width of riparian zone 6-12	in stubble height.  2 1 0  2 1 0  Width of riparian zone <6 meters;
(score each bank)  SCORE (LB) SCORE (RB)	macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9  Width of riparian zone >18 meters; human activities (i.e., parking lots,	evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height remaining.  8 7 6  Width of riparian zone 12-18 meters; human activites have	common; less than one half of the potential plant stubble height remaining.  5 4 3  Width of riparian zone 6-12 meters; human activities have	in stubble height.  2 1 0  2 1 0  Width of riparian zone <6 meters; little or no riparian vegetation due
(score each bank)  SCORE (LB) SCORE (RB)  10. Riparian Vegetative	macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9  Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or	evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height remaining.  8 7 6  Width of riparian zone 12-18 meters; human activites have	common; less than one half of the potential plant stubble height remaining.  5 4 3  Width of riparian zone 6-12 meters; human activities have	in stubble height.  2 1 0  2 1 0  Width of riparian zone <6 meters; little or no riparian vegetation due
(score each bank)  SCORE (LB) SCORE (RB)	macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9  Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or	evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height remaining.  8 7 6  Width of riparian zone 12-18 meters; human activites have	common; less than one half of the potential plant stubble height remaining.  5 4 3  Width of riparian zone 6-12 meters; human activities have	in stubble height.  2 1 0  2 1 0  Width of riparian zone <6 meters; little or no riparian vegetation due
(score each bank)  SCORE (LB) SCORE (RB)  10. Riparian Vegetative	macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9  Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or	evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height remaining.  8 7 6  Width of riparian zone 12-18 meters; human activites have	common; less than one half of the potential plant stubble height remaining.  5 4 3  Width of riparian zone 6-12 meters; human activities have	in stubble height.  2 1 0  2 1 0  Width of riparian zone <6 meters; little or no riparian vegetation due
(score each bank)  SCORE (LB) SCORE (RB)  10. Riparian Vegetative Zone Width	macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9  Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height remaining.  8 7 6  Width of riparian zone 12-18 meters; human activites have	common; less than one half of the potential plant stubble height remaining.  5 4 3  Width of riparian zone 6-12 meters; human activities have	in stubble height.  2 1 0  2 1 0  Width of riparian zone <6 meters; little or no riparian vegetation due
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(score each bank)  SCORE (LB) SCORE (RB)  10. Riparian Vegetative Zone Width (score each bank riparian zone)	macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9  Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height remaining.  8 7 6  Width of riparian zone 12-18 meters; human activites have	common; less than one half of the potential plant stubble height remaining.  5 4 3  Width of riparian zone 6-12 meters; human activities have	in stubble height.  2 1 0  2 1 0  Width of riparian zone <6 meters; little or no riparian vegetation due
(score each bank)  SCORE (LB) SCORE (RB)  10. Riparian Vegetative Zone Width (score each bank riparian	macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9  Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height remaining.  8 7 6  Width of riparian zone 12-18 meters; human activites have impacted zone only minimally.	common; less than one half of the potential plant stubble height remaining.  5 4 3  Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	in stubble height.  2 1 0  2 1 0  Width of riparian zone <6 meters; little or no riparian vegetation due to human activity.
(score each bank)  SCORE (LB) SCORE (RB)  10. Riparian Vegetative Zone Width (score each bank riparian zone) SCORE (SCORE	macrophytes; vegeative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9  Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height remaining.  8 7 6  Width of riparian zone 12-18 meters; human activites have impacted zone only minimally.	common; less than one half of the potential plant stubble height remaining.  5 4 3  Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	in stubble height.  2 1 0  2 1 0  Width of riparian zone <6 meters; little or no riparian vegetation due to human activity.

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Preliminary Jurisdictional Determination Form

# PRELIMINARY JURISDICTIONAL DETERMINATION FORM

## BACKGROUND INFORMATION

- A. REPORT COMPLETION DATE FOR PRELIMINARY JURISDICTIONAL DETERMINATION (JD): May 27, 2009
- B. NAME AND ADDRESS OF PERSON REQUESTING PRELIMINARY JD:

Ms. Lee Carolan

Palmer Engineering Company, Inc.

P.O. Box 747

Winchester, KY 40492-0747

- C. DISTRICT OFFICE, FILE NAME, AND NUMBER: CELRL, Midway Station, LRL-2009-372
- D. PROJECT LOCATION(S) AND BACKGROUND INFORMATION: (USE THE ATTACHED TABLE TO DOCUMENT MULTIPLE WATERBODIES AT DIFFERENT SITES)

State: KY County/parish/borough: Clark County City: Winchester

Center coordinates of site (lat/long in degree decimal format):

Lat. 37° 58' 37"N, Long. 84° 11' 51"W.

**Universal Transverse Mercator: NAD83** 

Name of nearest waterbody: Lower Howards Creek

Identify (estimate) amount of waters in the review area:

Non-wetland waters: total linear feet: 100.09(ft) acreage: 0.0147(ac).

Cowardin Class: Riverine

Stream Flow: Intermittent and Perennial Wetlands: 0.649 total acres, 0.0(ac) impacted.

Cowardin Class: Riverine

Name of any water bodies on the site that have been identified as Section 10

waters: None identified

Tidal:

Non-Tidal:

- E. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):
  - ☑ Office (Desk) Determination. Date:

Field Determination. Date(s): 28 July, 2008 / 22 May, 2009

1. The Corps of Engineers believes that there may be jurisdictional waters of the United States on the subject site, and the permit applicant or other affected party

who requested this preliminary JD is hereby advised of his or her option to request and obtain an approved jurisdictional determination (JD) for that site. Nevertheless, the permit applicant or other person who requested this preliminary JD has declined to exercise the option to obtain an approved JD in this instance and at this time.

2. In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "pre-construction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an approved JD for the activity, the permit applicant is hereby made aware of the following: (1) the permit applicant has elected to seek a permit authorization based on a preliminary JD, which does not make an official determination of jurisdictional waters; (2) that the applicant has the option to request an approved JD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an approved JD could possibly result in less compensatory mitigation being required or different special conditions; (3) that the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) that the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) that undertaking any activity in reliance upon the subject permit authorization without requesting an approved JD constitutes the applicant's acceptance of the use of the preliminary JD, but that either form of JD will be processed as soon as is practicable; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a preliminary JD constitutes agreement that all wetlands and other water bodies on the site affected in any way by that activity are jurisdictional waters of the United States, and precludes any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an approved JD or a preliminary JD, that JD will be processed as soon as is practicable. Further, an approved JD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331, and that in any administrative appeal, jurisdictional issues can be raised (see 33 C.F.R. 331.5(a)(2)). If, during that administrative appeal, it becomes necessary to make an official determination whether CWA jurisdiction exists over a site, or to provide an official delineation of jurisdictional waters on the site, the Corps will provide an approved JD to accomplish that result, as soon as is practicable. This preliminary JD finds that there "may be" waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:

SUPPORTING DATA. Data reviewe	ed for preliminary JD (check all that apply
	ed in case file and, where checked and
requested, appropriately reference	e sources below):
X Maps, plans, plots or plat subr	nitted by or on behalf of the
applicant/consultant:Palmer Engir	neering, April 2009.
X Data sheets prepared/submitte	ed by or on behalf of the
applicant/consultant.	
oxtimes Office concurs with data sh	The state of the s
	data sheets/delineation report.
Data sheets prepared by the	
Corps navigable waters' study	
U.S. Geological Survey Hydro	logic Atlas:
USGS 8 and 12 digit HUC	
X U.S. Geological Survey map(s	s). Cite scale & quad name:
	nservation Service Soil Survey. Citation:
57 N. 11 . 11 . 1 . 1 . 1 . 1 . 1 . 1 . 1	ou (a) Otto morros
National wetlands inventory m	
State/Local wetland inventory	
X FEMA/FIRM maps:21023000	
X 100-year Floodplain Elevation	
X Photographs: Aerial (Name & D	
	Pate): February 24 & 25, 2009.
Previous determination(s). Fit	le no. and date of response letter:
X Other information (please spe	city). Site photographs.
IMPORTANT NOTE: The information	on recorded on this form has not
necessarily been verified by the C	orps and should not be relied upon for
later jurisdictional determinations	
later jurioutetterial determinations	
Signature and date of	Signature and date of
Regulatory Project Manager	person requesting preliminary JD
(REQUIRED)	(REQUIRED, unless obtaining
•	the signature is impracticable)

Site number	Latitude	Longitude	Cowardin Class	Estimated amount of aquatic resource in review area	Class of aquatic resource
S.C01	0746005	4206771	Perennial	7.72 ft (0.00114) ac	non-section 10 – non-wetland
S.C02	0746177	4207381	Perennial	6.99 ft (0.00044) ac	non-section 10 – non-wetland
S.C03	0746185	4207415	Perennial	6.00 ft (0.00077) ac	non-section 10 – non-wetland
S.C04	0746242	4207534	Intermittent	6.18 ft (0.00087) ac	non-section 10 – non-wetland
S.C05	0746262	4207606	Intermittent	7.14 ft (0.00104) ac	non-section 10 – non-wetland
S.C06	0746329	4207794	Intermittent	7.91 ft (0.00124) ac	non-section 10 – non-wetland
S.C07	0746348	4207916	Intermittent	6.22 ft (0.00086) ac	non-section 10 – non-wetland
S.C08	0746246	4206801	Perennial	5.30 ft (0.00161) ac	non-section 10 – non-wetland
S.C09	0746568	4206936	Intermittent	9.85 ft (0.00111) ac	non-section 10 – non-wetland
S.C10	0746568	4206936	Intermittent	5.18 ft (0.00033) ac	non-section 10 – non-wetland
S.C11	0746624	4206886	Intermittent	25.72 ft (0.00443) ac	non-section 10 – non-wetland
S.C12	0746624	4206886	Intermittent	5.88 ft (0.00088) ac	non-section 10 – non-wetland
Wetland 1	0746060	4206966	Riverine	0.476 acres	non-section 10 – wetland
Wetland 2	0746037	4207047	Riverine	0.173 acres	non-section 10 – wetland

